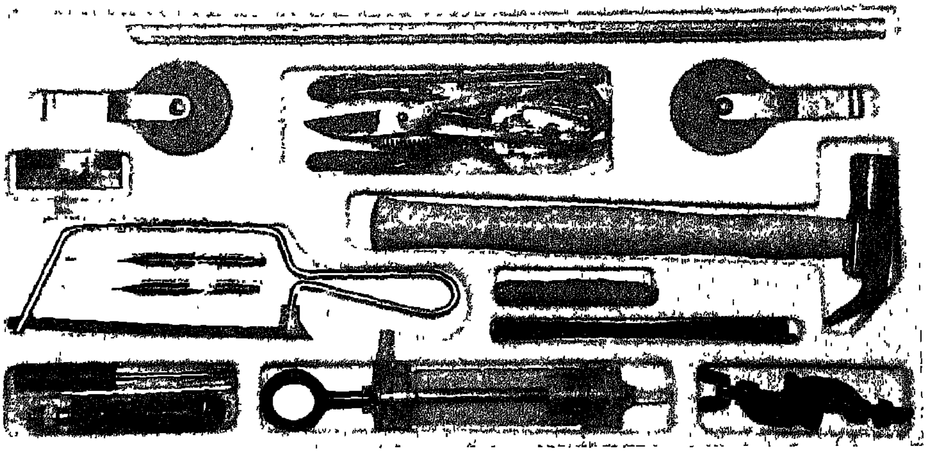
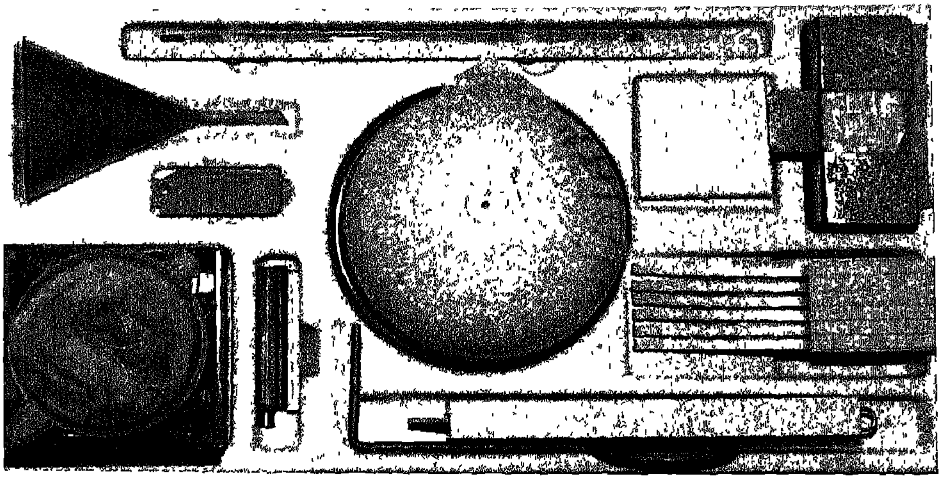
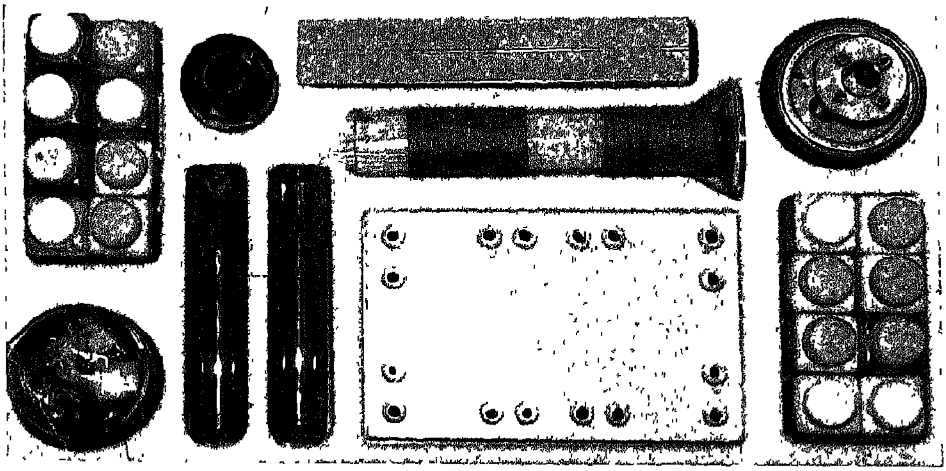


Upper Tray



Middle Tray



Lower Tray

INDO-FRG PROJECT (NCERT-GTZ)

IMPROVED SCIENCE EDUCATION IN PRIMARY AND MIDDLE SCHOOLS IN MADHYA PRADESH AND UTTAR PRADESH

MANUAL OF PRIMARY SCIENCE KIT

राष्ट्रीय शैक्षिक अनुसंधान और प्रशिक्षण परिषद्
NATIONAL COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING

November 1988
Kartika 1910

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FOREWORD

Under the Operation Blackboard, essential facilities for the primary school have been listed Primary science kit is one of them Workshop Department of NCERT has been engaging itself in the development and batch production of various science kits since 1969 Since early seventies a number of states and UTs got primary science kits of NCERT design manufactured.

This kit manual and the primary science kit have been developed by NCERT under Indo-FRG Project ''Improved Science Education in Primary and Middle Schools of M P. & U.P'' The broad components of the projects are—development of instruction materials, development and production of science kits and training of teachers. The project is being coordinated and monitored by the Workshop Department, NCERT It is expected to provide a strong base in bringing out qualitative improvement in the teaching of science at the primary level. The project has recently been oriented to provide technical and logistic support to the schemes formulated under the National Policy on Education (NPE) and Programme of Action (POA)

Though the primary science kit litself is one of the essential items listed under OB, all care have been taken to design and develop other possible items from the OB list and incorporate those in the kit Examples are teacher's handbook, plastic globe, educational chart, balance and weight, magnifying glass, magnet, measuring tape, pump, blackboard, chalk and duster

I express my thanks to the GTZ, Mr V Weisser, educational consultant & German team leader, Mr H H. Proeve, technical expert and other short-term experts for providing support and expertise Thanks are also due to Shri J Sagai, J S and Shri K M Acharya, Director, Ministry of Human Resource Development, Director-SCERT (U P) and Director-SISE (Allahabad), Principal Secretary, CPI, DPI-M P for their cooperation and keen interest I am greateful to Prof P K. Bhattacharyya-Head, Shri Abu Bashar- Senior Technical Officer and all members of technical staff in the Workshop Department for developing the kit, updating production technology and producing 660 new kits in two batches Due to their sincere efforts new design of a very useful kit which is durable, aesthetically attractive and of good quality could take birth. I also express my grateful appreciation to all members of the writing team, subject experts, participating teachers for their contribution in developing this kit manual.

I hope that the primary school teachers will find this kit and manual useful and interesting Suggestions and comments for further improvement of this manual will be most welcome The Council will give due consideration to all suggestions and comments while revising the present kit and manual

P.L. Malhotra
Director, NCERT

PREFACE

Much needed design improvement with an updated production technology has been incorporated in the present model of the Primary Science Kit developed under the Indo-FRG Project ''Improved Science Education in Primary and Middle Schools of M P. & U P'' The distinct features of multipurpose use, durability, simplicity and aesthetically pleasing get up, scope for increased activities in this model constitute the marked improvement over previous ones The total number of items in this model is 91 (considering the set of 70 charts as one item) Groupwise contents of the kit are given here

A) Measurement, demonstration, experiment	-49	Different type of apparatus/ instrument etc
B) Rock, minerals	-6	
C) Chemicals	-10	
D) Consumable etc	-12	
E) Hand tools	-9	
F) Charts	-70	
G) Books-3 volumes of teacher's handbook and 1 kit manual	-4	

This manual will help the teacher firstly to identify and then organise experiments using correctly the items of the kit which is basically a demonstration kit The contents are packed in a lockable box of mild steel sheet which offers durability and safe storage It has three vacuum formed trays in which the contents are blister packed The detachable lid can be joined to the back side of the box so as to build up a chalkboard of size 103 cm x 36 cm so that chalkboard facility is available even if the kit is used outside the classroom Green board paint has been used on the mild steel sheet Chalk powder and a mould for chalk one given in the kit The kit is a portable laboratory having all basic facilities of efficient heating, clamping by laboratory stand, measurement of length, volume, temperature, working with the interactive globe etc The students can learn by doing experiments with the help of the kit in small groups It offers 350 or more activities mentioned in the three volumes of the teacher's handbook. The user can write on the milky white surface of the globe with a sketch pen or wax pencil whenever necessary The inside of the globe has deposition of shining metal which makes it an ideal solar heater for heating test tube etc very efficiently The kit dimensions are-length 51 50 cm x width 27 0 cm x height 36 0 cm and weighs about 1150 kg The top serves as a table for performing experiments and demonstrations Most importantly, exploration of environment will be very efficiently carried out with the help of various instruments and tools of the kit

Many new moulds, dies and fixtures have been developed by now to bring down the price of the kit as well as to have products of uniform quality This has been possible with the cooperation from engineers and technicians of Indo-Danish Toolroom and Training Centre-Delhi, Institute of Tool Room and Training-Lucknow, Central Toolroom-Ludhiana and some small scale industries Hidden efforts made in this area will go a long way to implement OB so far development of production technology for the PSK is concerned

We are thankful to Prof P L Malhotra, Director who is the Chairman of the steering committee of the Indo-FRG Project and Prof A.K Jalaluddin, Joint Director for their guidance We thank Shri. R.C Srivastava, Manager-Vigyan Kit Nirmanshala, Allahabad and shri V K Saxena, Manager-Science Kit Workshop, Bhopal for their contribution to the project in arranging to get the technology absorbed in these new born workshops Our thanks are due to Dr B K. Sharma, Shri A Chakraborty and Dr P Kulshrestha and all members of staff of this department and members of pedagogy teams of U.P and M P for developing this kit manual.

V Weisser
Educational Consultant and
German Team Leader

P K Bhattacharyya
Head, Workshop Department
and Project Coordinator

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I HOW TO USE THE KIT AND THIS KIT MANUAL

This kit manual accompanies the new primary science kit developed in the Workshop Department under the Indo-FRG Project (NCERT-GTZ) "Improved Science Education in Primary and Middle Schools in M P & U P" The kit manual aims to provide you information about the various kit items which have usually multiple functions and are used in various learner-centred activities outlined in the Teacher's Handbooks for Environmental Studies-Science for Class III, IV and V prepared by the department The kit manual is meant to inspire you with confidence and self reliance for motivating the students to explore the environment through observation and learning by doing

While preparing the Teacher's Handbooks , it was felt that all the materials required for performing an activity may not always be easily available in the environment, specially in a rural situation The general thinking of the authors was to suggest such activities in the Teacher's Handbooks, some of which could be performed using materials available in the environment and some using basic items from the primary science kit The items needed for all activities in the Teacher's Handbooks for primary science were first listed and consolidated After trials with several alternative designs and the tryout of the kit, the present design of the kit box including kit items was finalised

The kit manual provides a classwise list of activities corresponding to the three Teacher's Handbooks, the manual specifies the items of Primary Science kit together with quantity of each In order to guide you in identifying a particular item, a line drawing of the same is given The precautions for using the item are also mentioned wherever necessary

The uses of each item are also mentioned together with a reference number to the activity Most of the items are for multiple purposes i.e the same item can be used in performing different activities of the same class or different calsses For example, the hand lens (Item No A 28) can be used as a magnifier for observing very small objects/particles (III 2 7 2, 2 7 4, IV 1 3.1, 3 8.2, 5 4 2) and as a converging lens for focussing the sun rays (IV· 6 5 E I) The number III 2 7 4 refers to Teacher's Handbook for class III, second unit, seventh sub-unit and fourth activity. The reference number IV 6 5 E I carries similar explanation with E I to be read as Extension 1

The chart numbers are given from F-1 to F-23, where F 1 is the sheet for displaying various charts, F-2 and F-3 are one-piece charts and F-4 to F-23 are interacting charts. The chart with different pieces form a single interacting chart. For expample F 4 1, F 4 2, F 4 3 are different parts of the same chart F-4 which may be displayed on the sheet provided for the purpose

As a teacher, you should plan beforehand and decide about the activities to be performed while teaching a topic. You can then pick up the items from the kit to be used in the activity You may also use some items procured form locally available or other resources and environment to serve as substitute/alternative to some of the kit items

You should take proper care in handling the kit items and their upkeep You may please fill up the form for user's record book regularly You should take out an item from the kit for performing an activity by gently sliding the particular tray in which the item is placed and replace the tray in proper position After use, the kit item may be placed in the proper place provided in the tray of kit box You should always and check the condition clean and number of items of the kit whenever you use them You should check the kit regularly every year in the first week of July, Septemeber and April If any kit item is found not working properly, broken or lost, these may be repaired or replaced by using the proper repair and replacement order form

Under Indo-FRG project the kit and kit items have been supplied to selected schools of the states of M.P and U P. It is hoped that the kit manual will prove helpful to teachers in using the different items of the kit effectively However it is open to further improvement on the basis of suggestions of teachers using it

II LIST OF ACTIVITIES SUGGESTED IN TEACHER'S HAND BOOK (CLASSES III,IV & V) ENVIRONMENTAL STUDIES-SCIENCE

CLASS III

UNIT 1· LIVING THINGS

(Things around us, Plants and animals around us, Animals and their way of life)

1.1 What are the characteristics of living things?
1.2 How do plants grow?
1 3 Do plants have different parts?
1.4 How are animals adapted to their food habits?
1 5 How are body parts of animals suited to their moving habits?
1 6 Where do different animals live?

Unit 2 OUR BODY, FOOD AND HEALTH

(Our body, Our food, Care of the teeth, Cleanliness of surroundings)

2 1 In what respects do we differ from each other?
2 2 How good is your sense of touch?
2 3 How good are your eyes?
2 4 How good are your ears?
2 5 How good is your sense of smell?
2 6 How good is your sense of taste?
2 7 How good are your teeth?
2 8 How do we classify food stuffs?
2 9 How should we take our food?
2 10 What are good hygienic habits that we should follow?

UNIT 3 MATERIALS AND THEIR PROPERTIES

(Materials around us, Solids, liquids and gases, Water- a wonderful liquid)

3 1 How do we clalssify objects?
3 2 Do materials occupy space and have weight?
3 3 Can a solid change into a liquid?
3 4 Can we change a liquid into gas?
3 5 Does water dissolve materials?
3.6 How much materials can be dissolved in given quantity of water?
3 7 What are the conditions which help in the quick dissolving of solids in water?
3.8 Do liquids other than water dissolve materials?

3.9 How do we use liquids for separating one material from the other?

UNIT 4 WEATHER AND SEASONS

(Weather, The Seasons)

4.1 What are different kinds of weather?
4.2 How do the weather conditions vary during different seasons?
4.3 How does it rain?
4.4 How does weather affect our lives?

UNIT 5 THE SKY

(The Sky)

5.1 What are the objects that are seen in the sky during day and night?
5.2 Where does the SUN apparently rise and set?
5.3 Where does the MOON get its light from?
5.4 What can we learn about stars?
5.5 How does the distance affect the apparent size of the SUN, MOON and stars?
5.6 How does the shape of the lighted portion of the MOON change?

CLASS IV

UNIT 1 LIVING THINGS

(Functions of different parts of a plant, Uses of plants and animals, Care and protection of plants and animals)

1.1 How does a plant hold itself into the soil?
1.2 Does a plant get water and minerals from the soil through the roots?
1.3 Is water, absorbed by the roots, transported to the other parts of the plant?
1.4 How do green leaves prepare food for the plant?
1.5 Do flowers produce fruits and seeds?
1.6 Do seeds produce new plants?
1.7 Are seeds dispersed in different ways?
1.8 Why should seeds and fruits be dispersed away from the mother plant?
1.9 Are plants useful to us?
1.10 Do plants need care and protection?
1.11 Are animals useful to human beings?
1.12 Do animals also need care and protection?

UNIT 2 HUMAN BODY, NUTRITION AND HEALTH

(Our body and its functions; Food and food sanitation; Safe water, Sanitation and diseases)

2 1 What are the various internal organs of the human body and how do they function?
2 2 How can we relate maintenance of good health with variou food stuffs?
2 3 Where does the food go in the body and get digested?
2 4 What care should be taken to prevent wastage of food and its nutrients?
2.5 How does food get contaminated and how to avoid contamination?
2 6 How does water get pollluted?
2.7 How does cleanliness of the surroundings help in preventing many diseases)?

UNIT 3 MATERIALS AND THEIR PROPERTIES

(Materials and their properties)

3 1 What are the specific properties of different objects?
3 2 Can different objects be made from the same material or different materials?
3 3 How are materials classified on the basis of their softness and hardness?
3 4 How do we classify objects on the basis of their ability to allow light to pass through them?
3 5 How do we classify materials on the basis of conduction of heat through them?
3.6 What is the effect of hammering on materials?
3 7 Do all materials dissolve in water?
3.8 Is matter made up of tiny particles?
3 9 Do materials break into tiny particles when dissolved in water?
3 10 How do we separate solids from liquids?
3 11 How do we recover soluble solids from a solution?

UNIT 4 AIR, WATER AND WEATHER

(Weather and its influence on life)

4.1 What is the role of the SUN?
4 2 What is the difference between evaporation and condensation?
4 3 What are the factors that affect the rate of evaporation?
4 4 What is the effect of cooling on water vapour and how does this affect the weather conditions?

4.5 What are the effects of heavy rain and frost on crops?
4.6 What are the effects of changes in weather conditions on the life of people, animals and plants?
4.7 What are the factors that determine weather?

UNIT 5 SOIL AND CROPS

(Soil and Crops)

5.1 What are the crops grown in your area?
5.2 Which crops are grown in different seasons?
5.3 What are the requirements for healthy growth of crops?
5.4 What are the similarities and differences between different kinds of soil?
5.5 What is good soil?
5.6 How do wind and water help in the formation and transportation of soil?
5.7 What are the types of soil required by different crops?
5.8 What are the ways by which soil could be made fertile?
5.9 How does the quality of seeds improve crop yield?
5.10 How does irrigation help crop yield?
5.11 How are crops protected from insects and diseases and how are they stored?

UNIT 6 FORCE, WORK AND ENERGY

(Work, Force and Energy)

6.1 What is force?
6.2 How is work done?
6.3 How do we exert force?
6.4 What is needed to do work?
6.5 What are the different forms of energy?
6.6 What is transformation of energy?
6.7 What can we do to save energy?

UNIT 7 THE EARTH AND THE SKY

(The Sky and the Earth)

7.1 How are planets and satellites different from each other?
7.2 How is a natural satellite different from an artificial satellite?
7.3 How do we relate the phases of the MOON with its revolution around the EARTH
7.4 How do day and night occur?
7.5 Do seasons occur due to the revolution of the EARTH?
7.6 Are the festivals, culturals activities and Indian calender related to the objects in the sky?

CLASS V

UNIT 1· LIVING THINGS

(Growth on response to stimuli in living things, Respiration and reproduction in living things, How living things adapt themselves, From seeds to seedlings)

1.1 Do living things differ from non-living things?
1 2 In what ways do plants and animals differ?
1 3 How are plants and animals adapted to their environment?
1 4 Do all seeds of a plant grow into new plants?
1 5 What are the conditions necessary for germination?
1 6 Are sunlight, minerals and water necessary for the proper growth of the plant?
1.7 Do variations exist in the rate of growth of seeding under similar conditions?

UNIT 2 HUMAN BODY, NURTITION AND HEALTH

(The bone cage—Our body and its movement; Deficiency diseases; Communicable diseases, Community sanitation)

2 1 What are the functions of skeletal system?
2 2 What is the relationship between the age and intake of food with occupation?
2 3 What are the deficiency diseases?
2 4 What are the common food practices and beliefs?
2 5 What is the need of preserving food?
2 6 What are the factors for the spread of communicable diseases and measures to prevent them?
2 7 What are the factors that contribute to insanitary conditions in the community and the step to prevent them?

UNIT 3 SOIL EROSION AND ITS CONSERVATION

(Soil Conservation)

3 1 What are different factors that contribute to soil erosion?
3 2 What are the ways to conserve soil?

UNIT 4· AIR AND ITS USEFULNESS

(Air-its uses and its pollution)

4 1 How do we know that air exerts pressure?
4.2 How do we use air in inflating thing like balloons and also in moving liquids?

4.3 What are the gases present in the air and in what ways are they important to us?
4.4 How do we distinguish between fresh and polluted air?
4.5 How do we recognise that polluted air is harmful to us and fresh air is essential for good health?

UNIT 5 FORCE, WORK AND ENERGY

(Forces, work and energy, simple machines)

5.1 What are the effects of applying force on different objects?
5.2 What happens when force is applied on soft objects?
5.3 What are the different ways of exerting force?
5.4 How is force exerted by gravity?
5.5 How is force exerted by a magnet?
5.6 How can work be made easier with the help of simple machines?
5.7 What are levers?
5.8 What are pulleys?
5.9 How does an inclined plane help in lifting?
5.10 How is wedge useful to us as a simple machine?
5.11 Is energy required for doing work?
5.12 Are sources of energy limited?
5.13 How is energy conserved?

UNIT 6 THE EARTH AND THE SKY

(Shadows)

6.1 What are transparent, translucent and opaque objects?
6.2 What are the factors affecting shadow formation?
6.3 How does the length of the shadow formed by the SUN change from morning to evening?
6.4 How do eclipses occur?

UNIT 7. NATURAL RESOURCES OF EARTH

7.1 What are the natural resources on the surface of EARTH and underground?
7.2 How do human beings use different natural resources?
7.3 What is the need of conservation of natural resources?
7.4 What are the steps for conservation of natural resources?
7.5 What are renewable and non-renewable resources?

LIST OF ITEMS FOR PRIMARY SCIENCE KIT

A MEASUREMENT, DEMONSTRATION, EXPERIMENT

	ITEM	QUANTITY
A 1	TAILOR'S MEASURING TAPE	1
A 2	RULER	1
A 3	PLASTIC SPOON	6
A 4	DISPOSABLE PLASTIC SYRINGE	2
A 5	PLASTIC BEAKER	2
A 6	GLASS BEAKER having pouring lip	1
A 7	MEASURING CYLINDER	1
A 8	DECIMETRE CUBE VESSEL	1
A 9	CUBIC CENTIMETRE BLOCK white and black	5 each
A 10	SPRING BALANCE	1
A 11	MAGNETIC COMPASS	1
A 12	(a) LABORATORY THERMOMETER with	
	(b) HOLDER	1
A 13	MIRRORED PLASTIC FOIL	10
A 14	GLOBE cum HEMISPHERICAL REFLECTOR	1
A 15	(a) SMALL PLASTIC BALL (Moon)	1
	(b) ATTACHMENTS for fixing A 14 and A 15	1
A 16	FUNNEL	1
A 17	Y-SHAPE PLASTIC TUBE	1
A 18	ELECTRIC CIRCUIT BOARD	
	(a) Base Plastic having 16 banana sockets, with attachment facility for circuit diagrams on backside,	
	(b) BATTERY HOLDER with symbol	
	(c) BULBHOLDER with the provision to attach with reflector of a torch	
	(d) SWITCH press type with symbol	
	(e) MULTICORE WIRE with BANANA PLUGS. 30 cms long wire with banana plugs-3 nos, 17cm long wires with banana plugs-3 nos.	
	(f) CROCODILE CLIPS-2 nos	
	(g) TORCH BULB 1 5V, screw type	1

A 19	MULTIPURPOSE PUMP	1
A 20	WEDGE/inclined plane and rod stand	1
A 21	PULLEY	2
A 22	MOUNTING NEEDLES with plastic handle	2
A 23	PLASTIC TUBING	1
A 24	WATER WHEEL	1
A 25	GLASS SLIDES	6
A 26	PLASTIC CONTAINERS with screwed caps having built in lids Plastic transparent/translucent, labelled containers	8 each
A 27	GLASS NOZZLE Hard Glass,	1
A 28	HAND LENS (A) Plastic frame with holder/attachment for optical bench and attachment to hold two lenses together (b) Glass/plastic lenses	6
A 29	GLASS BALL (MARBLES) Four sizes, (10mm, 15mm)	10 each
	(20mm, 25mm)	5 each
A 30	TEST TUBE with rim	10
A 31	BOILING TUBES with rim	2
A 32	KEROSENE BURNER	1
A 33	WIRE GAUZE	1
A 34	FOR FUTURE INCLUSION	
A 35	ALUMINIUM KATORI with HANGER	2
A 36	PLANE MIRROR Stainless Steel,	1
A 37	TEST TUBE STAND	1
A 38	RODS Iron/M S , plastic, aluminium, glass,	1 each
A 39	FERRITE MAGNETS	1 Pair
	TEST TUBE HOLDER	1
	TEA STRAINER	1
	MOULD for chalk sticks/small candles	1
	SUPER ENAMELLED COPPER WIRE	1
	FOR FUTURE INCLUSION	

A 45	DRAWING PINS	12
A 46	IRON NAILS	
	(a) 1 4mm diameter x 25mm long	5
	(b) 2mm diameter x 25mm long	5
	(c) 5mm diameter x 125mm long	1
A 47	RUBBER STOPPER	
	(a) for 15mm diameter test tube	3
	(b) With two holes, 6mm diameter and 8mm diameter for 25mm diameter test tube	1
	(c) with one hole 6mm diameter for 15mm diameter test tube	2
A 48	RUBBER SUCKER 25mm cup diameter without handle	2
A 49	KITBOX	
	(a) KITBOX	1
	(b) TRAYS	3
	(c) Right angle clamp (boss head)	1
	(d) MULTIPURPOSE RING EXTENSION	1
	(e) LABORATORY ROD	1
A 50	LOCK AND KEY Padlock with two keys	1
A 51	CELL No R20, dry cell 1 5 Volts, leakproof	1

B ROCK, MINERAL CHIPS IN TRANSPARENT LABELLED PLASTIC CONTAINERS WITH SCREWED CAPS (A26)

	ITEM	QUANTITY
B 1	HARD COKE	30g
B 2	MICA	5g
B 3	SLATE STONE	30g
B 4	WHITE MARBLE	90g
B 5	GRANITE	90g
B 6	LIME STONE	90g

C CHEMICALS IN PLASTIC CONTAINERS WITH LID (SCREWED CAPS, A 26)

	ITEM	QUANTITY
C 1	FERTILIZER - Ammonium sulphate or Urea	50g
C 2	FERTILIZER - Calcium superphosphate	50g
C 3	GLYCERINE	30ml
C 4	WASHING SODA	50g
C 5	COMMON SALT (mined crystals)	50g
C 6	POTASSIUM PERMANGANATE in crystal form	50g
C 7	SUGAR	50g
C 8	VASELINE	30g
C 9	ALUM	50g
C 10	IRON FILINGS	20g

D MISCELLANEOUS

	ITEM	QUANTITY
D 1	PLASTICINE	50g
D 2	COTTON THREAD	1
D 3	FILTER PAPER	12
D 4	POLYETHYLENE BAGS	20
D 5	RUBBER BALLOONS	
	(a) approx. dia 200mm when inflated	12
	(b) approx dia 100mm when inflated	6
D 6	RUBBER BANDS	
	(a) 24mm diameter	
	(b) 50mm diameter	12 each
D 7	SAND PAPER	
	(a) rough, no 60	
	(b) fine, no 120	1 sheet each
D 8	SPONGE	1
D 9	CANDLE	2
D 10	WAX	100g
D 11	CHALK POWDER	100g
D 12	STRAW PIPES	12

E HAND TOOLS

		ITEM	QUANTITY
E	1	COMMON HANDLE	1
E	2	SCREW DRIVER TIP	1
E	3	POKER/DRILL TIP	1
E	4	JUNIOR HACKSAW with 5 spare blades steel hardness	1
E	5	TIN CUTTER	1
E	6	CLAW HAMMER with wooden handle	1
E	7	BLADE WITH HOLDER	1
E	8	COMBINATION PLIER	1
E	9	SCREW DRIVER, with 3mm-blade, standard	1

F CHARTS

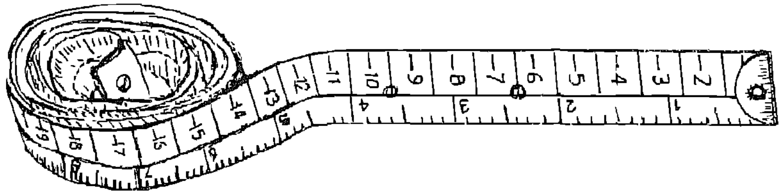
		ITEM	QUANTITY
F	1	Special display hanging holder for pieces of charts	1
F	2	Young ones with their adults (cow, cat, dog, hen, gram, tree)	6 pieces
F	3	Parts of a flowering plant (mustard plant, flower, stem & leaves, roots)	3 pieces
F	4	Body parts of different animals which help them to move (butterfly, fish, frog, snake, sparrow, human being)	6 pieces
F	5	Homes of various animals (ants, spider, honeybee, snake, woodpecker, lion)	6 pieces
F	6	Eye testing chart	2 pieces
F	7	Different types of seeds with their structures helping in dispersal (Seeds with hairs, hooks, spines, thorns, wings, lightweight)	6 pieces
F	8	Human body (internal structure) with sense organs (head, chest, belly)	3 pieces
F	9	Structures of heart (external/internal)	2 pieces
F	10	Environmental pollution (air, water, noise)	3 pieces

F	11	Hydroelectric power station (total plant, details)	2 pieces
F	12	Digestive system (upper/lower part)	2 pieces
F	13	External features of a fish	2 pieces
F	14	External features of toad and jumping frog	2 pieces
F	15	Aquatic plants (hydrilla, trapa)	2 pieces
F	16	Parts of a lotus plant (full plant, fruit)	2 pieces
F	17	Feet of various animals (camel, cow, dog, horse)	4 pieces
F	18	Plants and animals of cold climate (cedar, pine, sheep, yak)	4 pieces
F	19	External features of a flying bird and aeroplane	2 pieces
F	20	Human body skeleton (skull, thorax, legs)	3 pieces
F	21	Balanced diet	2 pieces
F	22	Structures to control water flow (dams, stone walls around well, river bank)	3 pieces
F	23	Terraced cultivation (general diagram, details)	2 pieces

G BOOKS

G	1	TEACHER'S HANDBOOK (three volumes, class III, IV, V)	1
G	2	KIT MANUAL	1

ITEM A1 TAILOR'S MEASURING TAPE

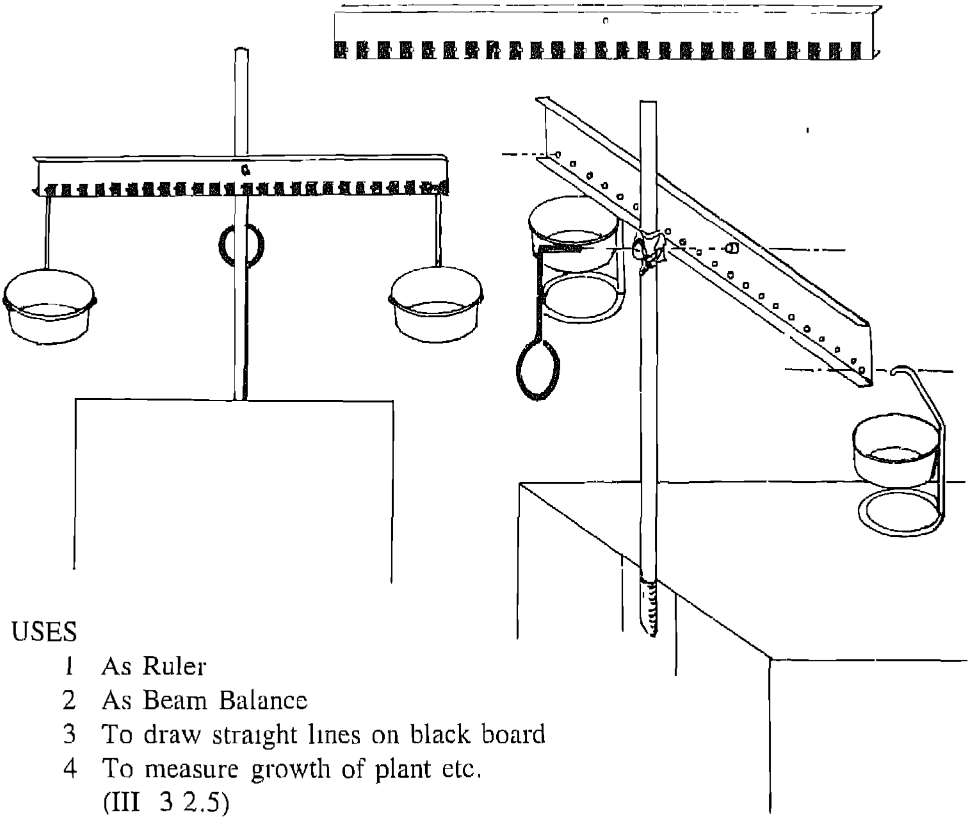


USES

1. For measurement of distance, length, breadth and height
2. For measurement of the girth of chest after breathing in and out
   (IV. 2 1 3, V 1.1 1, 1 2 1, 6 3 1)

NOTE While measuring length, reading of initial point and other points of the measuring tape should be taken by keeping eye at position A, not at A′ or A″

ITEM A2 RULER



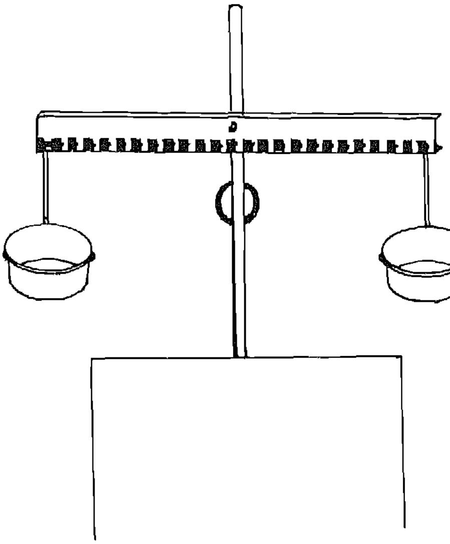
USES

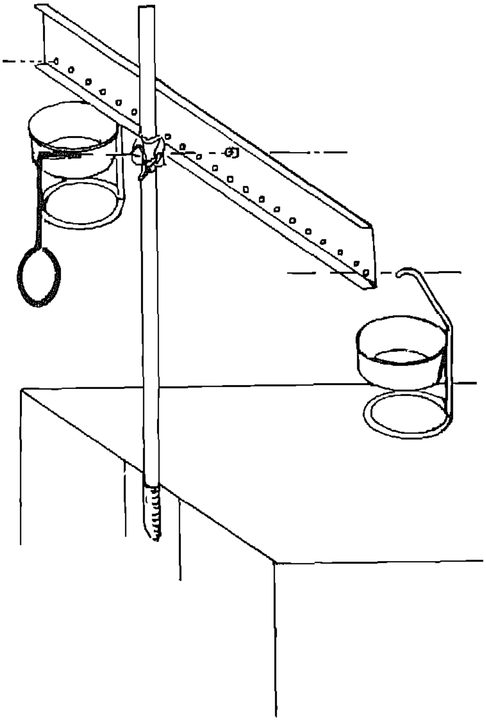
1. As Ruler
2. As Beam Balance
3. To draw straight lines on black board
4. To measure growth of plant etc.
   (III 3 2.5)

BEAM BALANCE

Parts of Assembly with Catalogue No

(1) Kit box with built in socket A 49 (a)
(2) Laboratory Rod A 49 (e)
(3) Ring Extension A 49 (d)
(4) Boss head A 49 (c)
(5) Ruler A 21
(6) Aluminium Katories A 35
(7) Suspension wire for A 35



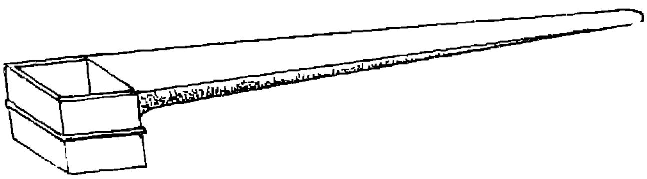


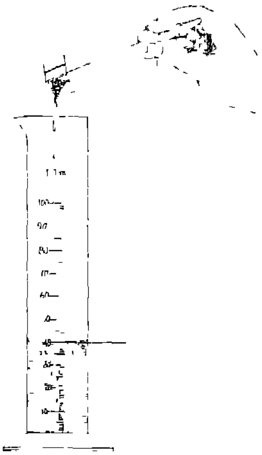
Suggested Assembly steps

(1) Insert the laboratory rod into the socket of the kit box
(2) Fix the boss head on the laboratory rod
(3) Attach the small arm of the ring extension to the boss head as shown in the figure
(4) Insert the middle hole of the ruler on the small arm of the ring extension
(5) Hang the suspension wires at equal distances from the centre of ruler on both sides by inserting their upper ends into the holes of ruler
(6) Insert aluminium katories in supension wire rings

Note If above said assembly is not balanced, this can be done by using some other small kit items)

ITEM A3 PLASTIC SPOON



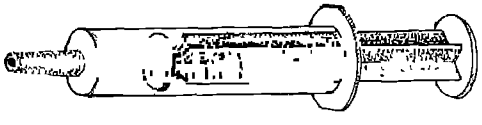


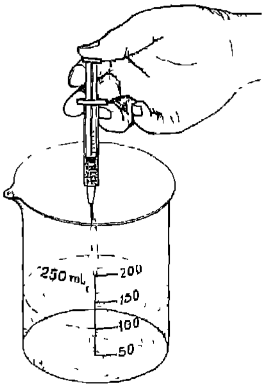
USES

1 For measuring quantity (volume)
2 To give the idea of 1 c.c or 1/2 c c
3. To calibrate measuring vessels and cans
(III 3.6 2, 3 7 2, V. 3 1 3, 4 3 2)

Note The plastic cubes should never be placed inside plastic spoons
Reading should be taken by keeping eye at position A, not at A′ or A″

ITEM A4. DISPOSABLE PLASTIC SYRINGE

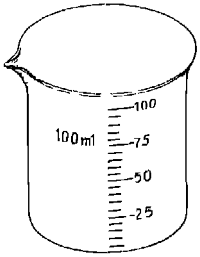




USES.

1 For sucking or pushing air and water
2. To show that air can be used to inflate things
(III 3 2 3)

ITEM A5 PLASTIC BEAKER

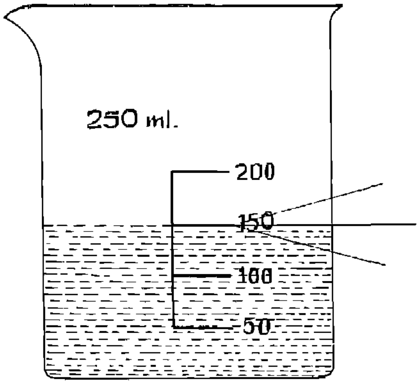


USES

As container for keeping liquids

Note It should not be used for heating

ITEM A6 GLASS BEAKER HAVING POURING LIP



USES.

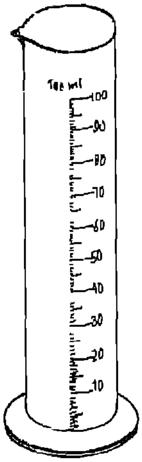
As container

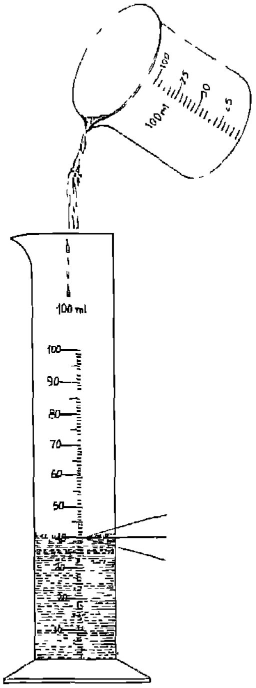
1. For keeping and heating liquids
2. Can be used for recording the rise or fall in the level of water in different situations
   (III· 2 9 4, 3 1 2, 3 2 3, 4 3 3, 4 3 4, 4 3 5,
   IV· 1 1 2, 1 2 E2, 1 6 2, 2 5 1, 2 6 1, 2 6 3, 3 5 2, 3 8 2, 3 10 1,
   4 2.1, 5 5.5, 6 4 2, 2 6 4, V. 1 5 1, 3 1 1, 3 1 2, 3 1 3, 3 2 3, 4 2 2,
   4 3 1, 4 3 2)

Note While heating liquids in glass beaker, it is essential to keep wire gauge below it

Reading should be taken at the lower level of water by keeping eye at position A, not at A′ or A″

ITEM A7 MEASURING CYLINDER





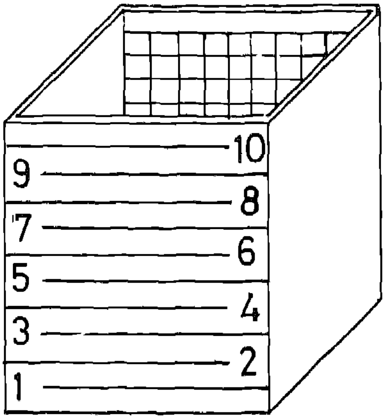
USES.

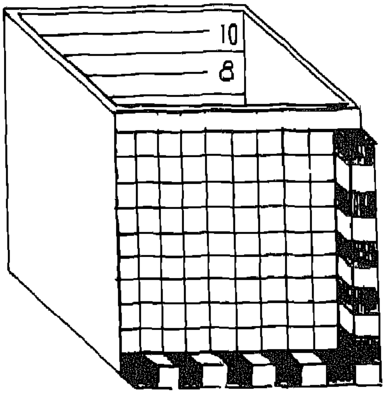
1 For measuring volume of liquids upto 100 ml (in steps of 1 ml)

2 For measuring rise or fall in the level of liquid
(III 3.1 4, 3 2 1, 3.2.4, 3 2 E2, 3 6 2)

Note: Reading should be taken at the maniscus by keeping eye at position A and not at A′ or A″

ITEM A8. DECIMETRE CUBE VESSEL



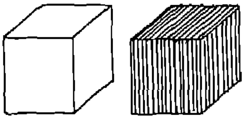


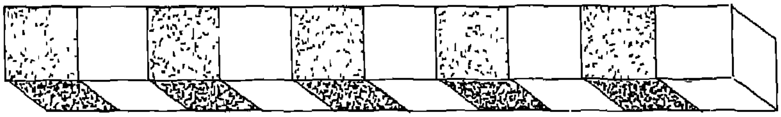
USES·

1. Container of liquid, 1 litre capacity
2. Container in the activity to show that air contains oxygen which is used in combustion
3. To help children understand the volume and unit of litre
4. To develop in children understanding of inter-relationships of length, area and volume, (with special reference to 10 cm as an example of length, 10 cm x10 cm = 100 cm^2 as an example of area, and 10 cm x 10 cm x 10 cm = 1000 c c as an example of volume)

(III 3 1 4, 3.1.5, 3 1 6, IV 1 4 E2, V 4 3 1,
1 2 1, 4 1.1)

ITEM A9 CUBIC CENTIMETRE BLOCK (WHITE AND BLACK)





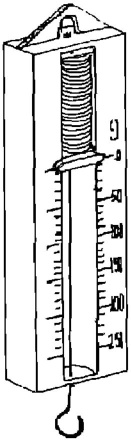
USES

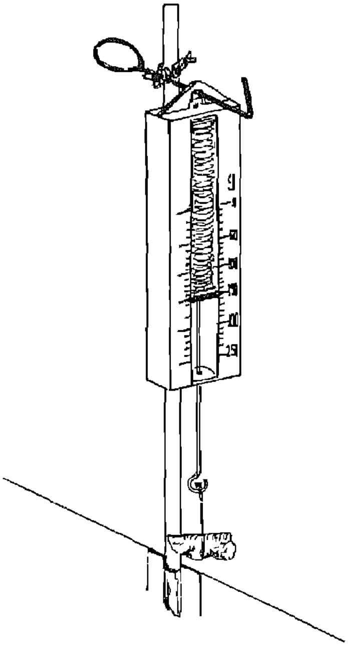
1. To give an idea of volume of 1 cubic centimetre.
2. As an object
3. To develop understanding of relationship between length, area and volume

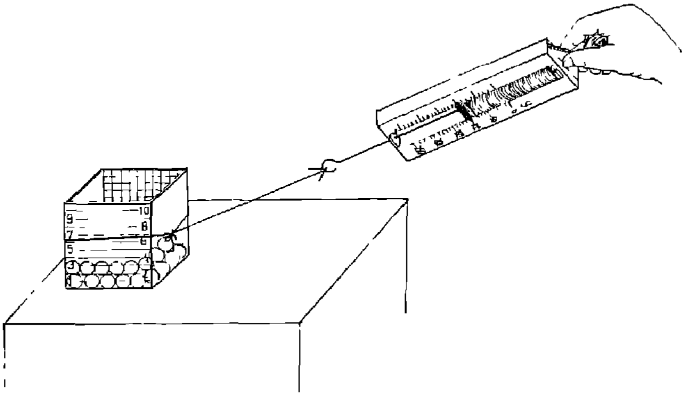
(III 2 3 1, IV: 6 5 2)

Note :The cubic centimetre blocks (plastic cubes) should never be placed inside plastic spoons

ITEM A10 SPRING BALANCE







USES

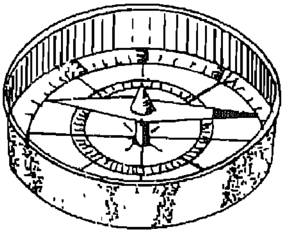
1 To give an idea about measurement of force (how force can be measured)

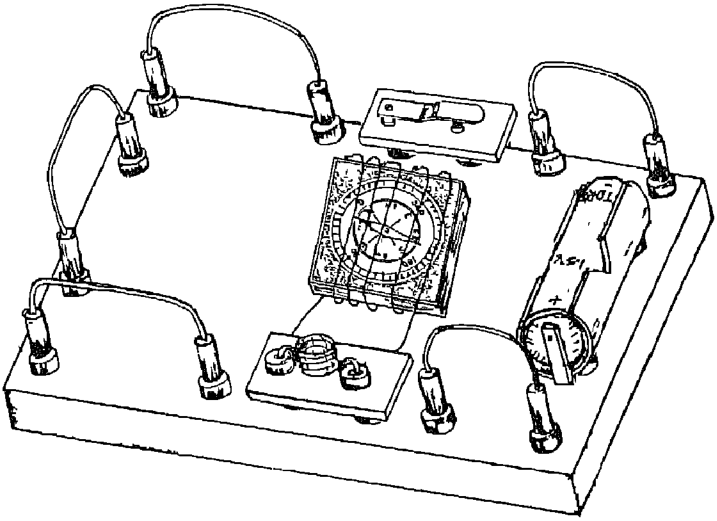
2,. (a) Frictional force (b) Pull

3. To give an idea of Newton as unit of force

(V. 5 8 1, 5 9 1)

ITEM A11· MAGNETIC COMPASS



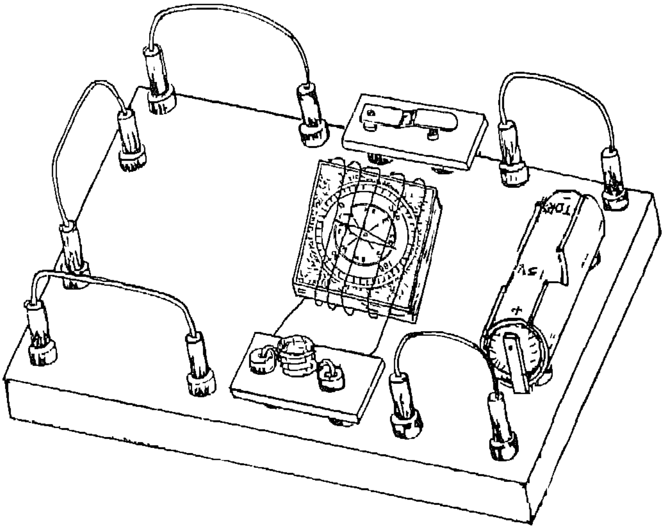


USES.

1 To show north and south directions
2 To show effect of magnetic force
3 To show attraction of iron nail or other objects made of iron by magnets
4 To perform various other experiments on magnetism

(V. 6 3. E1)

MAGNETIC EFFECT OF CURRENT BY MAGNETIC COMPASS

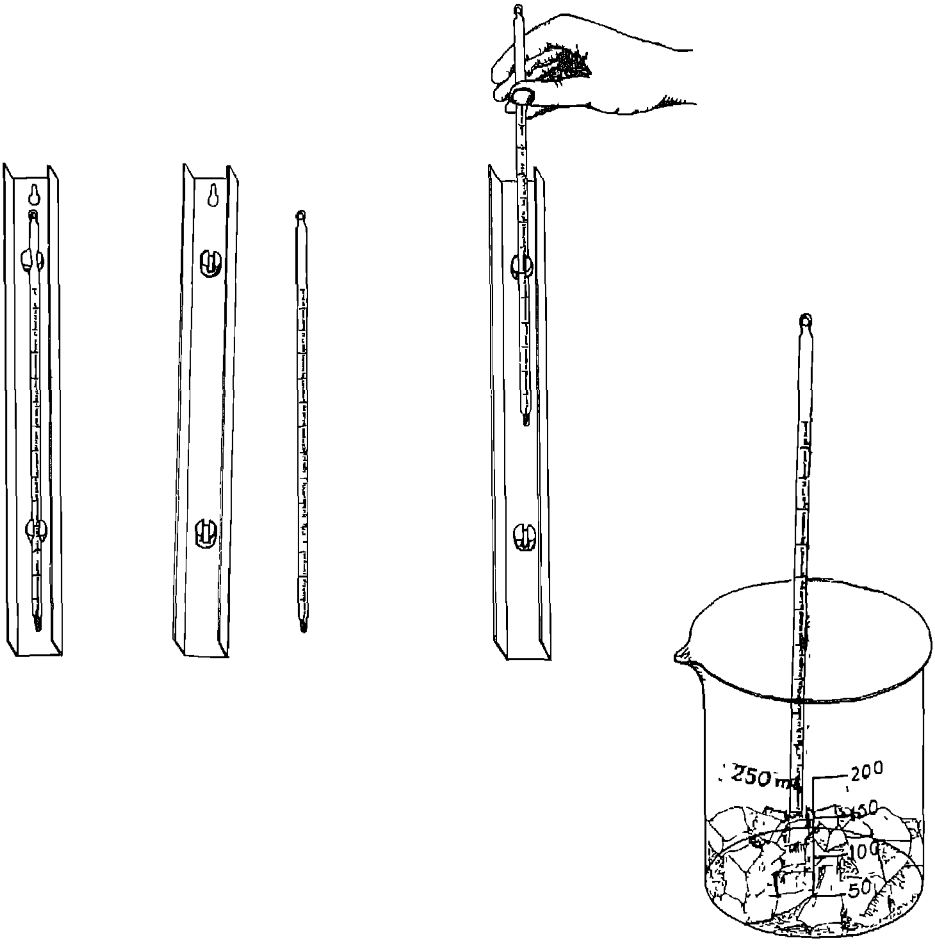


Parts of Assembly with catlogue No
1. Plastic base A 18 (a)
2. Battery Holder A 18 (b)
3. Cell A 51
4. Multicore wire with banana plug of A 18 (e)
5. Super enamelled copper wire A 43
6. Magnetic compass A 11

Suggested Assembly steps
1. Insert the dry cell into the battery holder of the electric circuit board
2. Wind the super enamelled copper wire over the compass box so that its length is at right angle to the magnetic needle.
3. Pass electric current through the supereneamelled copper wire wound over the magnetic compass for a short time with the help of multicore wire banana plug joined to the two ends of the battery holder as shown in the figure

Note Before using the super enamelled copper wire, its both ends should be rubbed with sand paper

ITEM A12. LABORATORY THERMOMETER WITH HOLDER



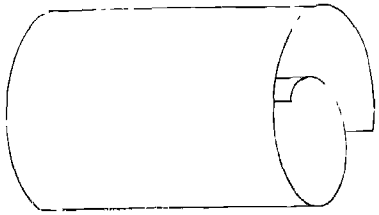
USES

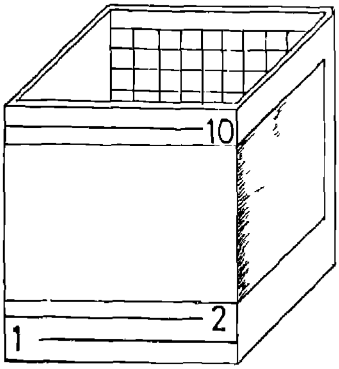
1. For recording temperature of room
2. For measuring temperature of liquid or any other substance
3. For measuring temperature of ice

Note: Reading should be taken by keeping eye at position A, and not at position A' or A''

To pull out thermometer from holder, its glass end should be pulled from top, as shown in figure III

ITEM A13: MIRRORED PLASTIC FOIL



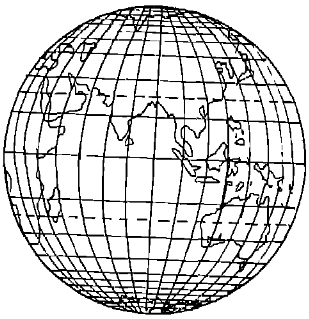


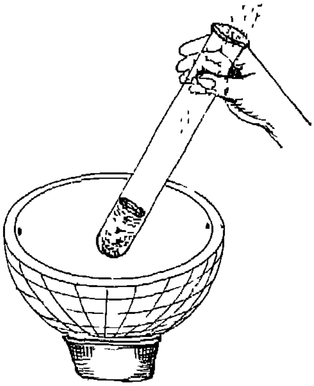
USES·

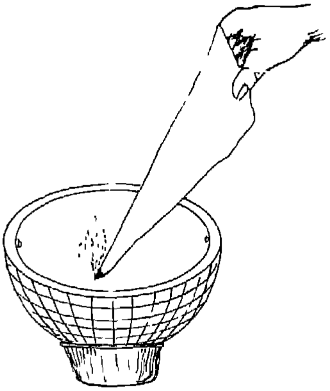
1 As plane mirror, when fixed on a flat/plane surface
2 As cylindrical or spherical mirror, when fixed on a cylindrical or spherical surface

Note Avoid rough handling of the mirrored surface

ITEM A14 GLOBE CUM HEMISPHERICAL REFLECTOR







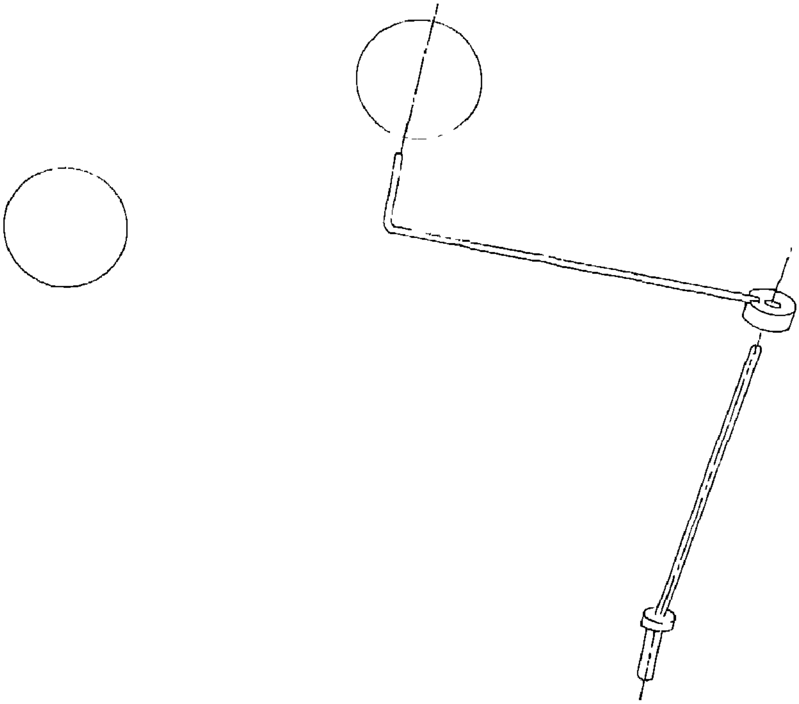
USES

1 As spherical mirror/reflector
2 To show how day and night are occuring
3. As a model of earth for understanding the variation of seasons
4 To demonstrate occurrences of solar and lunar eclipses
5 To illustrate how earth appears flat though it is spherical

(III· 5 2 2, 5 3 3, 5.6 3; IV 6.5 8, 7 4 E 1, 7 5.2, 7 1 4, 7 3 1, 4 4.2,V 6 2 1, 6.3 1, 6.4 1, 6.4 2)

Note.The focal point of refelctor is at 40 mm above bottom

ITEM A15 (a) SMALL PLASTIC BALL (MOON)

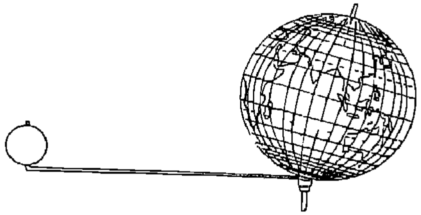


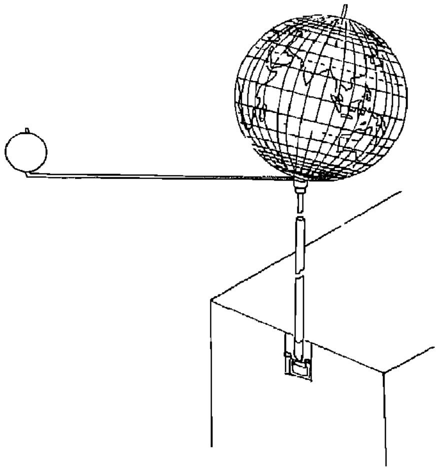
USES:

1. As a model of moon
2. To show formation of shadows
3. To demonstrate lunar and solar eclipses.
4. To compare the roundness of the ball with other items

(III: 5 3.3, 5 5.1, 5.6 3; IV 7.1 4, 7.3 1, 7 5 2; V 6 2.1, 6 2 2, 6 2 3, 6 3.1, 6 4 1, 6 4 2)

ITEM A15 (b) ATTACHMENT FOR FIXING A 14 AND A 15 (a)

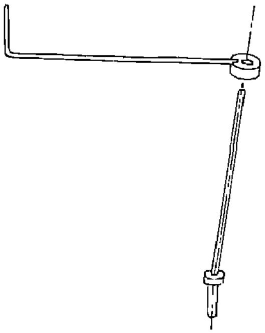


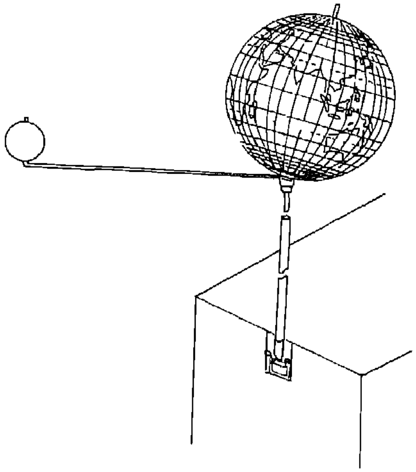


USES.

1 To show the earth model in the inclined position
2 To make the moon model, revolving around the earth model
(III 5 3 3, 5 6 3, IV 7 1.4, 7 3.1, V 6 2 1 6.3 1, 6 4.1, 6.4.2)

EARTH MOON ASSEMBLY





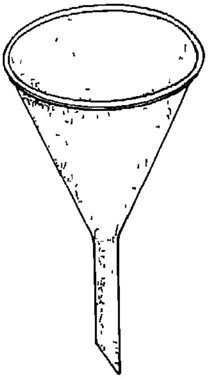
Parts of assembly with catelogue No.

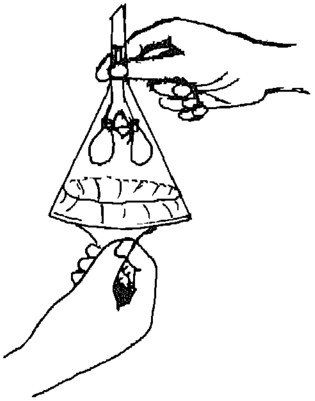
1. (1) Kit box with socket A 49 (a)
2. (2) Laboratory rod A 49 (e)
3. (3) Attachment for earth and moon model A 15 (b)
4. (4) Earth model or globe A 14
5. (5) Small plastic ball (Moon) A 15 (a)

Suggested Assembly steps

1. (1) Fix the laboratory rod into the socket of the kit box
2. (2) Insert the attachment for earth and moon model into the hole at the top of laboratory yod
3. (3) Attach the earth model to the inclined rod of A (15b)
4. (4) Attach the small plastic ball (moon) to the vertical rod of A 15 (b)

ITEM A16 FUNNEL



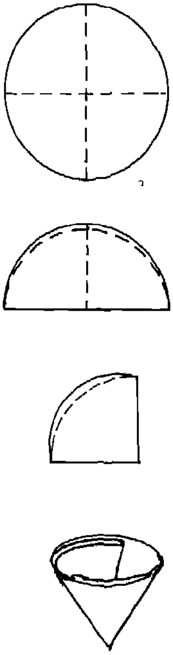


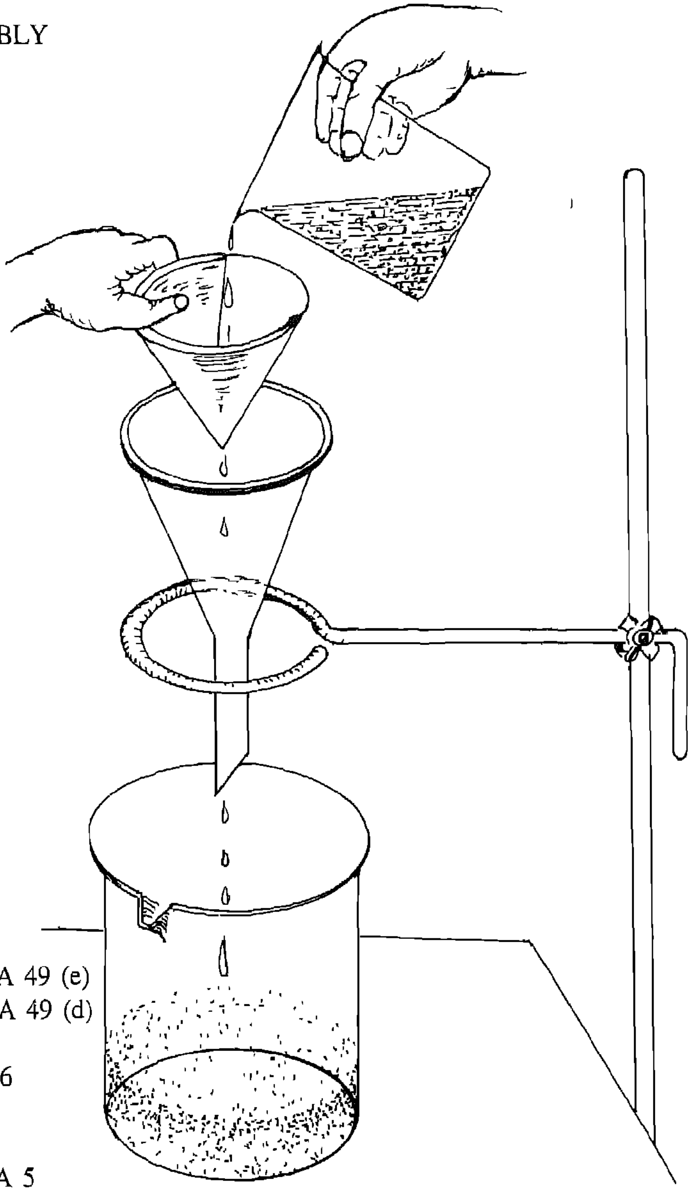
USES:

1. For pouring liquids into containers
2. For filteration
3. For showing condensation of water vapours
4. For demonstrating process of inspiration and expiration during respiration
5. To demonstrate evolution of oxygen during photosynthesis.

(III 3 2 E1, 4.3 3, IV 1 4 E2, 2.1 4, 2 1 9, 2 6 3, 3 10 2, 4.2 1, V 1 2.2)

FILTERATION ASSEMBLY





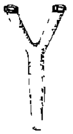
Parts of Assembly with
Catelogue No

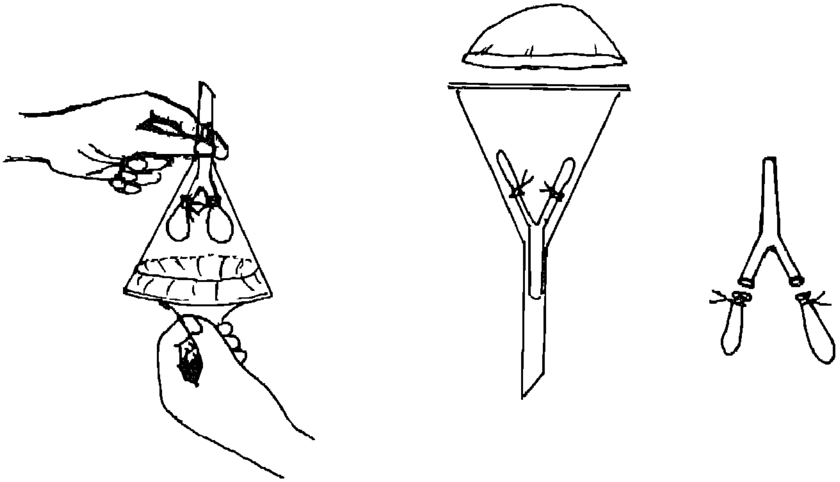
1. Laboratory rod A 49 (e)
2. Ring Extension A 49 (d)
3. Clamp A 49 (c)
4. Glass beaker A 6
5. Funnel A 16
6. Filter paper D-3
7. Plastics beaker A 5

Suggested assembly steps

1. Fix the laboratory rod into the socket of the kit box
2. Fix the clamp on the laboratory rod
3. Attach the ring extension to the boss head
4. Keep the funnel into the ring.
5. Fold the filter paper as shown in figures (a), 6 (b), 6 (c) and 6 (d)
6. Insert the folded filter paper into the funnel
7. Keep the beaker below the ring and place it on the surface of the kit box

ITEM A17 'Y' SHAPED PLASTIC TUBE



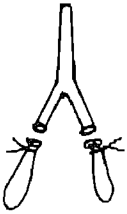


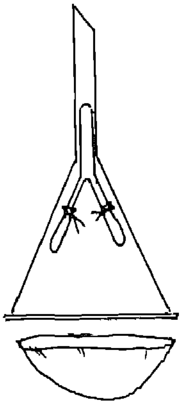
USES

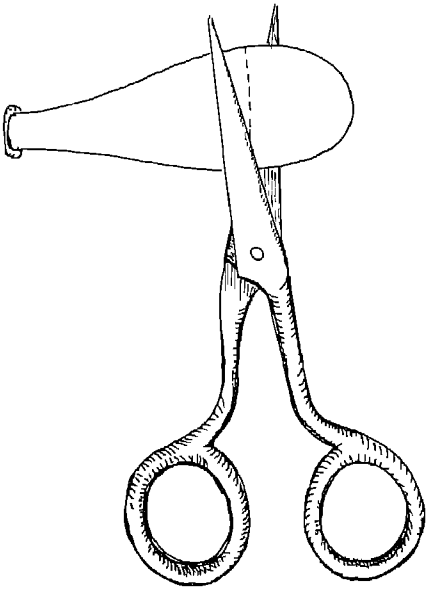
1 To demonstrate inspiration and expiration by fixing it inside a funnel and attaching two small balloons to it

(IV. 2 1 4)

BREATHING MECHANISM







Parts of Assembly with Catelogue No

1. 'Y' shaped plastic tube A 17
2. Small balloons D 5 (b)
3. Big balloons D 5 (a)
4. Funnel A 16

Suggested Assembly Steps

1. Insert the straight lower part of the 'Y' shaped plastic tube inside the lower limb of the funnel
2. Cut a bigger balloon into two halves and
3. Take one half of balloon having no mouth-stretch it and cover the mouth of the funnel with the stretched part

ITEMS A18 ELECTRIC CIRCUIT BOARD

(a) Plastics base having 16 banana sockets with attachment facility for circuit diagram on the back side

(b) Battery holder with symbol

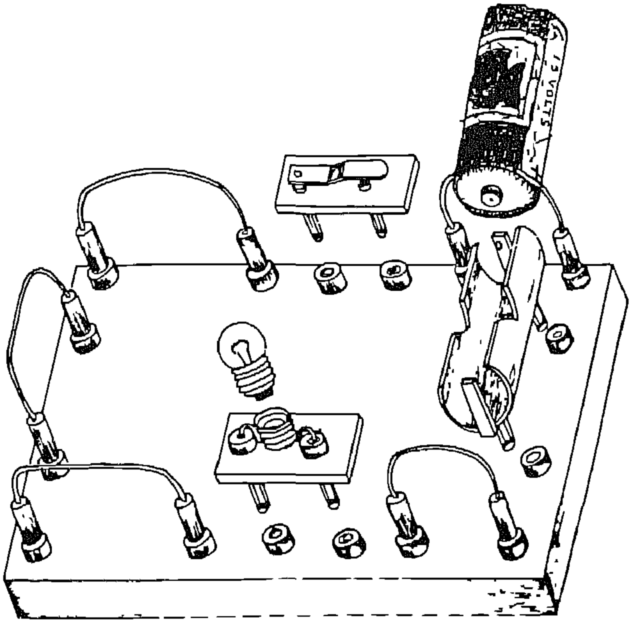
(c) Bulb holder with provision to attach with reflector of a torch

(d) Switch press type with symbol

(e) Multi-core 30 cm long wire with banana plugs-3 Nos, 17 cm long wire with banana plugs-3 Nos

(f) Crocodile clips-2 Nos

(g) Torch bulb 1 5 V screw type.

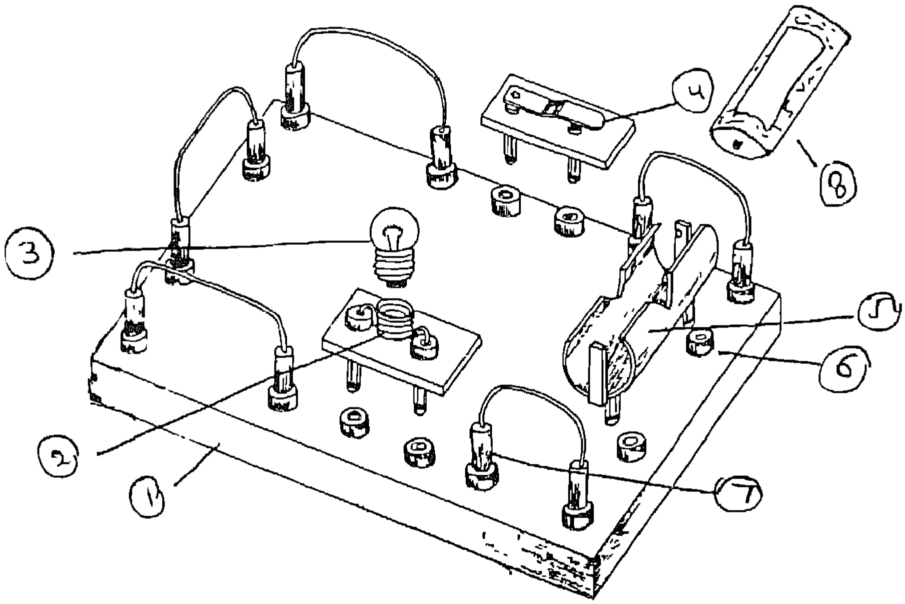


USES

1. To illustrate essential components of a simple electrical circuit
2. To demonstrate make and break of a circuit
3. To demonstrtate how electricity is used to do work
4. To demonstrate conversion of electrical energy into heat and light energy
5. To magnetise iron nail
6. This simple circuit can also be used to classify materials as conductor and non-conductor of electricity.

(IV. 6 6 2)

ELECTRIC CIRCUIT BOARD



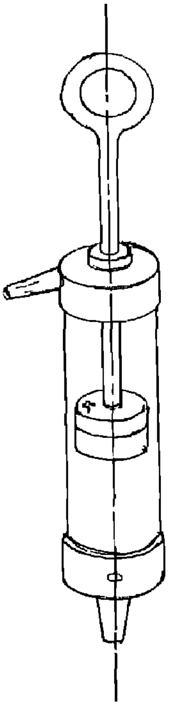
Parts of Assembly with Catalogue No

(1) Base Plastics A 18 (c)
(2) Bulb holders A 18 (c)
(3) Torch Bulb A 19 (g)
(4) Switch press type A 18 (d)
(5) Battery holder A 18 (b)
(6) Banana Socket A 18 (a)
(7) Multicore wire A 18 (c) with banana plugs
(8) Cell A 51

Suggested Assembly steps

(1) Insert the banana plugs of the multi core wire into the banana sockets
(2) Insert the torch bulb into the bulb holder by screwing it
(3) Insert the cell into the battery holder
(4) Pass electric current by pressing the press type switch

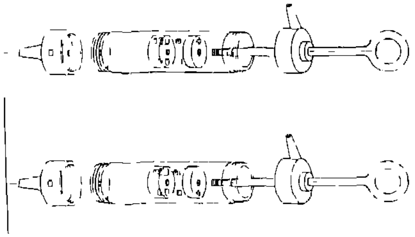
ITEM A19 MULTIPURPOSE PUMP

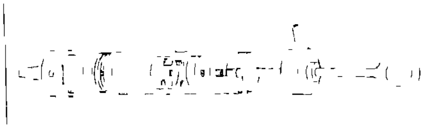


USES

1 To demonstrate the working of a simple water pump
2. To suck water from a container, like a syringe
3 To demonstrate how air pressure can be used to lift water

MULTI-PURPOSE PUMP ASSEMBLIES





PARTS OF MULTI-PURPOSE PUMP A 19

1. Body tube of pump (1)
2. Upper Cap (2)
3. Lower Cap (3)
4. Handle (4)
5. Piston Cap (5)
6. Piston valve (6)
7. Ball (Two in number) (7)

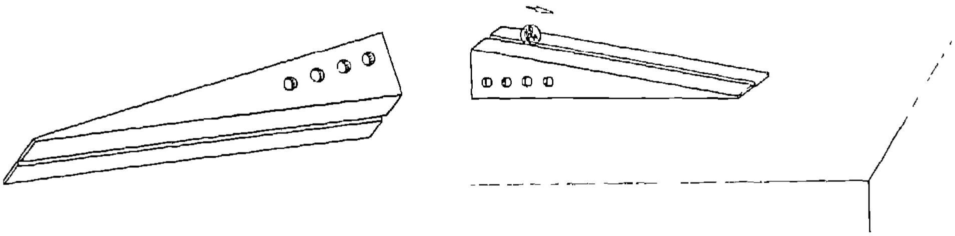
SUGGESTED STEPS FOR WATER PUMP ASSEMBLY (A)

1. Fix upper cap (2) at top of handle (4)
2. Put one Ball (7) inside hole, going through piston (6).
   Piston Cap (5) is to be fixed in a way, so the star opening of piston cap (5) face hole having ball (7) Tight piston (6) piston cap (5) and handle (7) together
3. Put one ball (7) in hole of lower cap (3) and tight with closed end (having star) of the body tube of pump (1)
4. Insert piston inside body tube of pump (1) with the help of handle
5. Tight upper cap (2) with open end of body tube of pump (1)

SUGGESTED STEPS FOR SYRINGE/VACUUM PUMP/PRESSURE PUMP ASSEMBLY (B)

1. Fix upper cap (2) at top of handle (4)
2. Put both balls in both holes of piston (6)
   Fix piston cap (5) on valve in a manner so its pin faces the hole going through valve (5)
3. Tight piston (6) piston cap (5) and handle (4)
4. Insert piston inside body tube of pump (1) with the help of handle (4)
5. Tight lower cap (3) with closed end (having star) of body tube of pump (1) and upper cap (2) with open end of body tube (1)

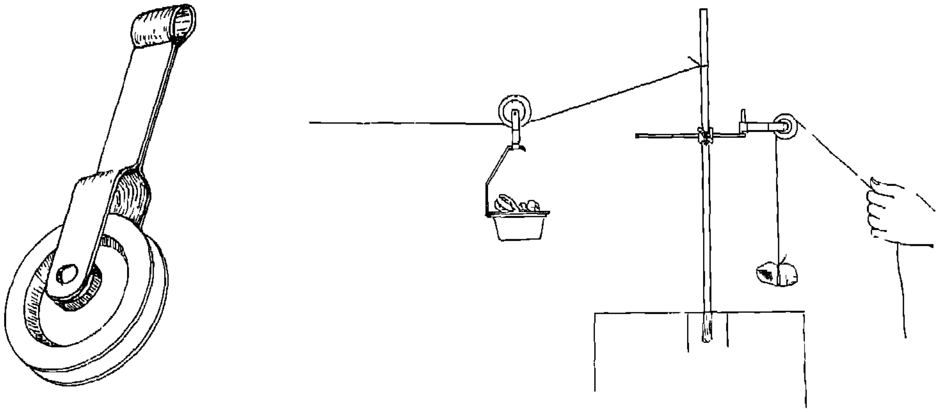
ITEM A20 WEDGE/INCLINED PLANE AND ROD STAND



USES

1. As inclined plane in lifting heavy loads
2. To demonstrate conversion of energy
3. To keep rods of different metals
   (IV 6 5 2, V 5 9 2)

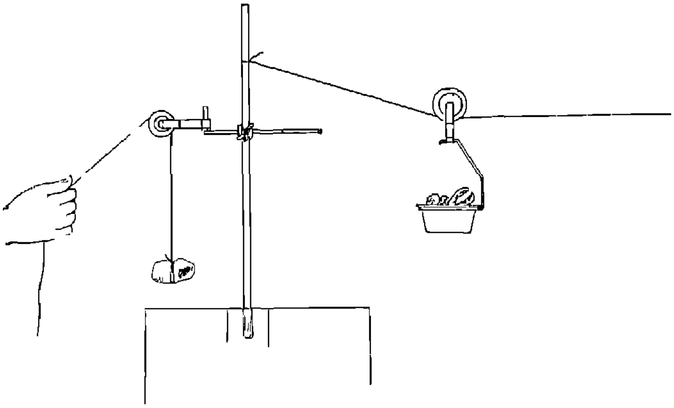
ITEM A21 PULLEY



USES

1. To demonstrate how pulley help us in doing work
2. To give an idea of pulley as a simple machine/lever
   (V· 5 8.1)

PULLEY



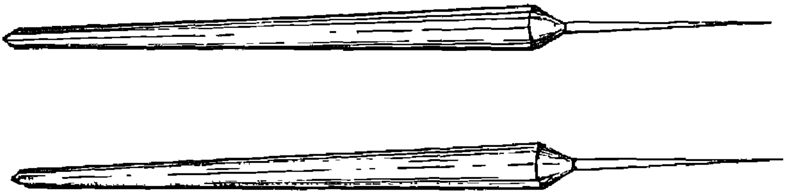
Parts of Assembly and Cataglue No

1. Socket inbuilt in Kit box A 49 (a)
2. Laboratory rod A 49 (e)
3. Boss head A 49 (c)
4. Ring Extension A 49 (d)
5. Pulley A 21
6. Aluminium Katori with hanger A 35
7. String

Suggested Assembly Steps

1. Insert the laboratory rod into the boss head socket of the Kit box
2. Fix the clamp to the laboratory rod
3. Attach the ring extension to the boss head as shown in the figure.
4. Fix the pulley to the small vertical rod of the ring extension

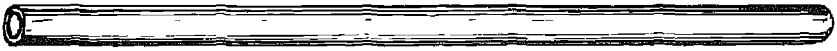
ITEM A22· MOUNTING NEEDLES WITH PLASTIC HANDLE

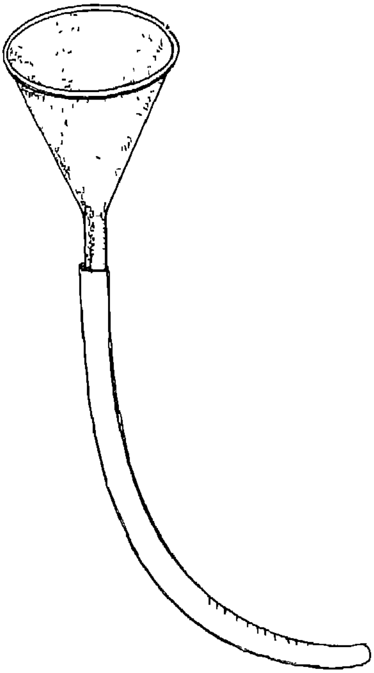


USES

1 To point out different parts of animals and plants
2 To separate different parts of a flower.
3 To transfer small things on the glass slide
4. To make holes in paper and other such things

ITEM A23· PLASTIC TUBING

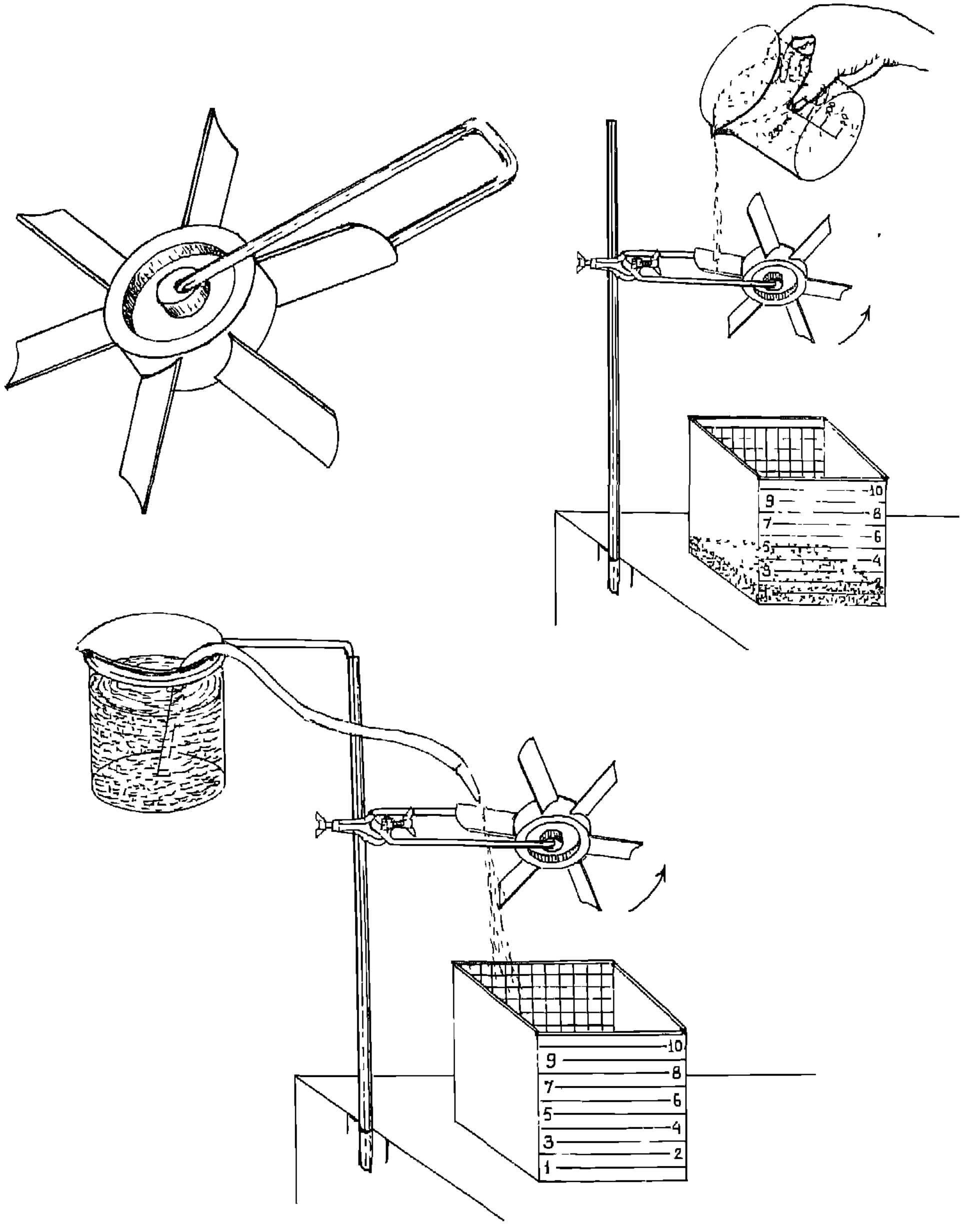




USES

1. To study the working of siphon
2. To prepare the working model of stethscope with the help of funnel and rubber balloon diaphram
3. To show that a liquid maintains the same level in both the arms when the tube partly filled with liquid is bent in the form of U tube and held vertically
   (IV· 2 1.8, 2 1.9)

ITEM A24 WATER WHEEL

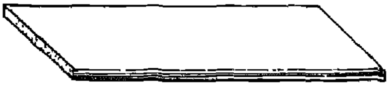


USES

1. To show that energy of falling water can drive a wheel
2. To show how steam and air can be used to move water wheel
   (IV 6 4 2, 6 5 4, 6 6 5, V 7.2.1)

Note Take precaution that steam does not strike your finger or any other part of your body.

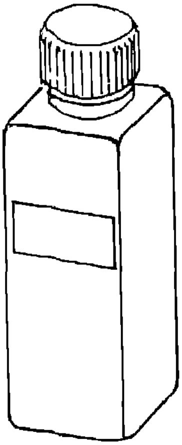
ITEM A25 GLASS SLIDES



USES -

1 To observe small insects and different parts of a flower on this With the help of a hand lens.
2 To check the sense of touch.
3. To show the property of hardness and brittleness (this can be done only with broken pieces)
4 To be used as a transparent object
(III 2 2 1, IV 3 1.1, 3 3 1, 3 3 2, 3.4 1, 3 4 2, 3 4 3,
3 6 2, V 6 1.2, 6.1.3)

ITEM A26 PLASTIC CONTAINERS WITH SCREWED CAPS HAVING BUILT IN LIDS PLASTIC TRANSPARENT/TRANSLUSCENT, LABELLED CONTAINERS

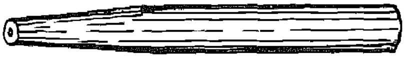


USES.-

1 As containers for keeping chemicals, rocks and minerals

Note It should never be used as a container for hot liquids

ITEM A27: GLASS NOZZLE (HARD GLASS)

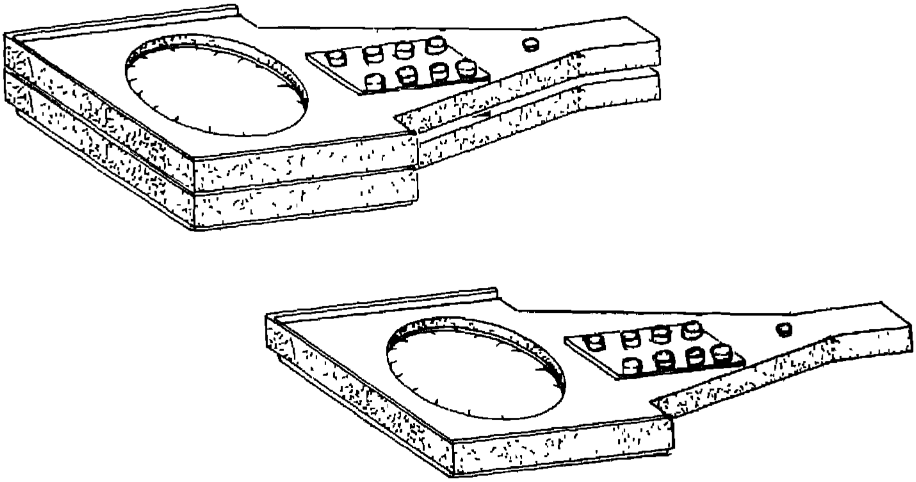


USES -

1 As a jet to show that the steam energy can be used to drive a wheel
(IV 6 5.4, 6.6 5)

ITEM A28 HAND LENS

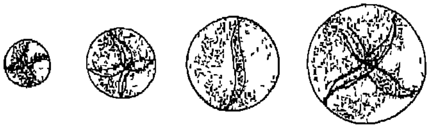
(a) Plastic frame with holder/attachment for optical bench and attachment to hold two lenses together
(b) Glass/plastic lenses



USES:-

1 To magnify small objects
2. To find out different components of soil
3 To find our different components of humus
4 To find out the external features of plants and animals
5. To study the morphology of floral parts, small plants and animals.
(III· 1.2 1, 2.7.2, 2.7.4, IV· 1.3 1, 1.3 E2, 1 6.1, 2.4.1, 3 8 1, 3 8.2, 3 11 E3, 5.4 2, 6 5.1, 6 5 7, V· 2.5 2)

ITEM A29 GLASS BALLS (MARBLES)
FOUR SIZES, (10 mm, 15 mm, 20 mm, 25 mm)



USES:-

1 As an object of glass
2 As an object to show that materials occupy space and have weight
3. To demonstrate that closely packed marbles have space in between them
4 To exhibit rolling friction
(III. 3 1 2, 3.1.4, 3.2 1, 3 2 5, 5.5 1; IV· 3.1.1)

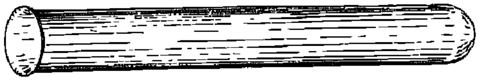
ITEM A30. TEST TUBE WITH RIM

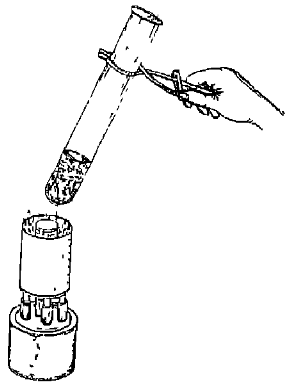
USES.-

1 To keep and heat small quantity of liquid
2 For conducting chemical reactions, e g passing carbon dioxide through lime water.
3. To collect oxygen released by hydrilla plants during photosynthesis
(III: 2 6 1, 2 6.2, 3 1.3, 3.1 5, 3 1.6, 3 4 1, 3 4.E1,
3 5.1, 3 7 2, 3 8.2, 3 9.2, 3 6.2; IV 1 2 1, 1.3 1, 1 4.E2, 3 7 1,
3 9 1, 3.10.1, 3 10.2, 5 4.1, 5 4 3, 5 5 2, 5.5 6, 5 6.E1, 5 5.5., V.
1 1.3, 1 2 2)

Note. Test tubes of ordinary glass should not be used to heat liquids

ITEM A31 BOILING TUBES WITH RIM



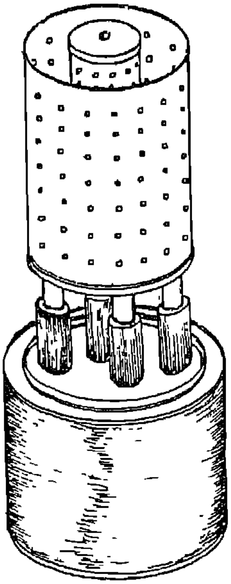


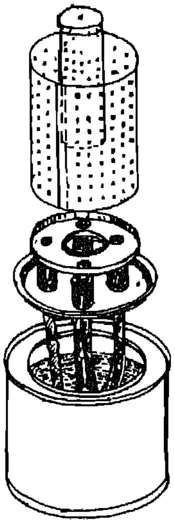
USES:-

1 To keep and boil small quantity of liquid.
2. As small reaction vessel

IV· 2 1 5, 5 5 4, 6.5 4, 6 6.5)

ITEM A32: KEROSENE BURNER



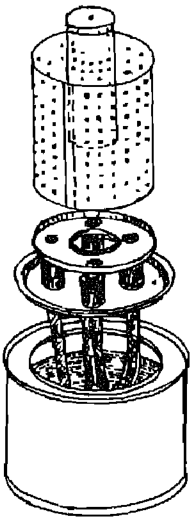


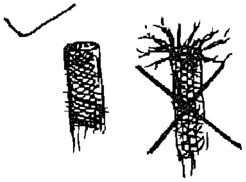
USES:-

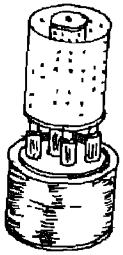
1 For heating in various activities.
(III: 3.3.1, 3.4.1, 3.7.2, 4.3.3, IV: 2.6.3, 3.5.2, 3.11.1,
4.2.1, 6.5.3, 6.5.4, 6.5.5, 6.6.5; V: 2.4 E1)

Note.
1 Check the position and size of the wicks before lighting the burner
2 Don't fill more than 1/2 of container, with kerosene
3 Light the wicks only after putting the outer chimney in its correct position
4. Put off the lighted burner only by covering the top of the outer chimney with tin/metal plate

KEROSENE BURNER



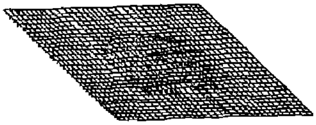


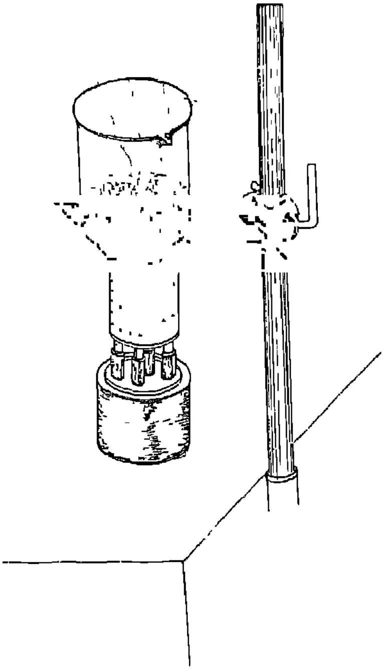


Parts of Assembly with Catalogue No
(1) Cap
(2) Wick holder
(3) Base
(4) Upper lid
(5) Inner Chimney
(6) Outer Chimney
(7) Kerosene container
(8) Isolator

Suggested Assembly Steps
(1) Fill 1/2 of container with kerosene
(2) Fix the upper lid into it along with the wicks
(3) check the wicks holder and the wicks
(4) Fix the inner chimney into the wick holder
(5) Cover the mouth of the inner chimney with the cap.
(6) Fix the wick holder so that the inner chimney is fully covered

ITEM A33. WIRE GAUZE





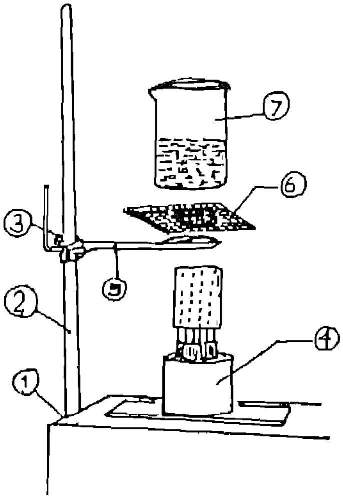
USES -

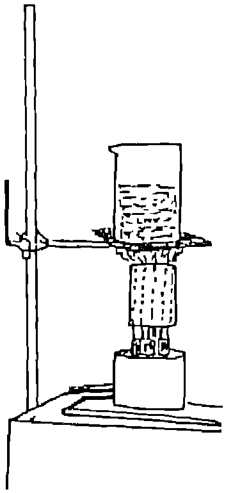
To Keep over the flame of a burner, when liquid in a glass container is kept over it, for heating

(III 4 3 3, IV 3.5.2, 3.11.1, 4.2.1)

Note· For heating something in a Katori the use of wire gauze is not necessary, unless heating is to be done slowly.

HEATING ASSEMBLY





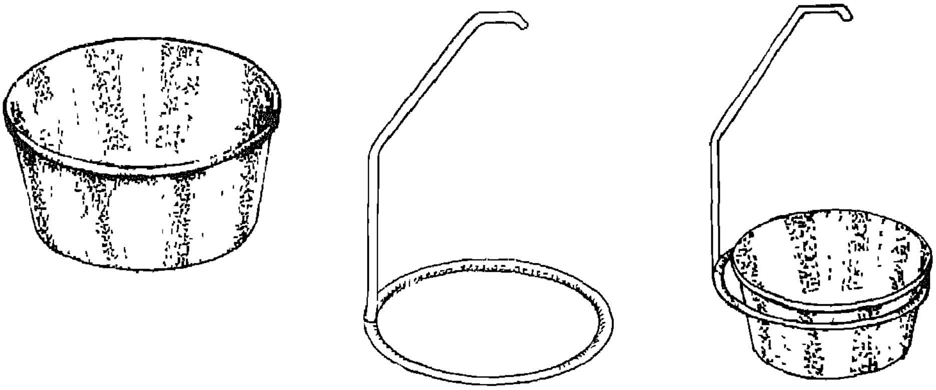
Parts of Assembly with Catalogue No.

(1) Socket inbuilt in Kit box A 49 (a)
(2) Laboratory rod A 49 (e)
(3) Clamp A 49 (c)
(4) Kerosene burner A 32
(5) Ring extension A 49 (d)
(6) Wire gauge A 33
(7) Glass beaker A 6

Suggested Assembly Steps

(1) Fix the laboratory rod into the inbuilt socket of the kit box.
(2) Attach the ring extension to the laboratory rod
(3) Keep the wire gauge over the ring
(4) Place the Kerosene burner below the ring and keep it on the surface of the kit box
(5) Keep the glass beaker over the wire gauge.

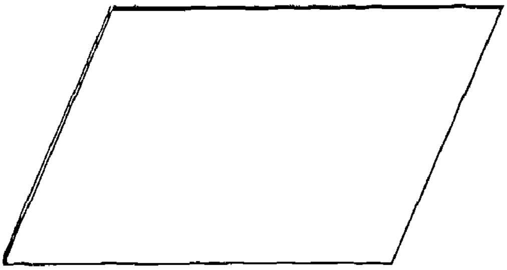
ITEM A35 ALUMINIUM KATORIES WITH HANGER



USES:-

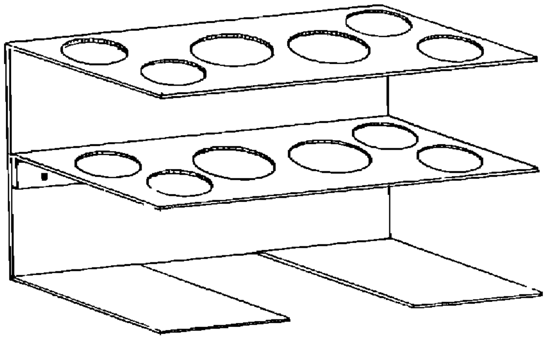
1 As a container or vessel for heating
2 As pan of a beam balance
3 To show vapourisation, boiling and melting process
(III 2 9 3, 3 3.1, 3.3 2, 3 4 2, IV· 1 4.E1, 1 4E2, 2.5 1,
3 11 1, 4 1 5, 4.3.2, 4.4 2, 6 5 3, V 1 5 E2, 2 4 E1, 3 2 3)

ITEM A36. PLANE MIRROR (STAINLESS STEEL)



USES.-
1 To show reflection of light
2 To observe the conditions and positions of teeth
3. T show that the air breathed out contains water vapour
(III: 2 6 5, 2 7 2, 2.7.4, 5 3 6; IV: 2.5 1, 6.5.3)

ITEM A37 TEST TUBE STAND

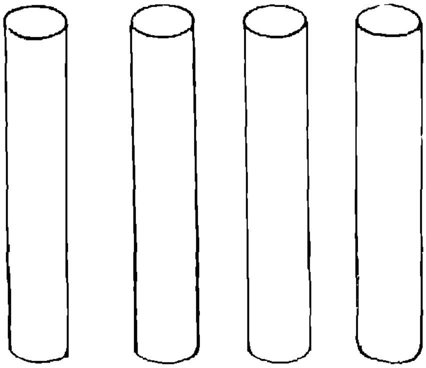


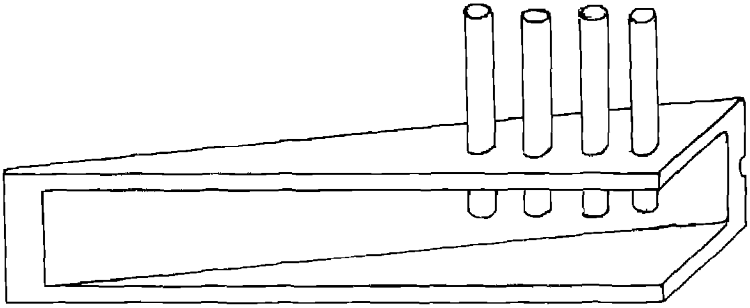
USES -

To keep test tube straight/erect

(III: 3.4 E1, 3.5.2, IV. 1.2.1, 1 3 1)

ITEM A38. RODS
IRON/M S , PLASTIC, ALUMINIUM, GLASS

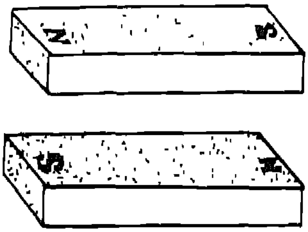


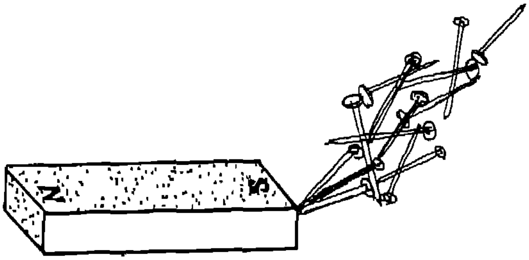


USES /

1 As objects of different materials to show that materials of equal volumes have different weights
2 To show magnetic effect of current (Electro-magnet) with the help of iron rod
3. To classify materials on the basis of conduction of heat
4. To use glass rod as magnifier.
5. To show that it is easier to roll than to slide
(III 3.2 E2, IV, 3.2 1, 3 2.2, 3 5.2, 6 5 2)
Rods are made up of
(a) Iron length 78mm, diameter 8 mm and weight 30g
(b) Aluminium, length 78 mm diameter 8mm and weight 10g.
(c) Glass, length 78mm, diameter 8 mm and weight 6.7 g.
(d) Plastic, length 78 mm, diameter 8 mm and weight 5g

ITEM A39 FERRITE MAGNETS



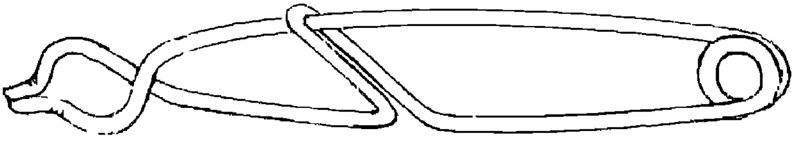


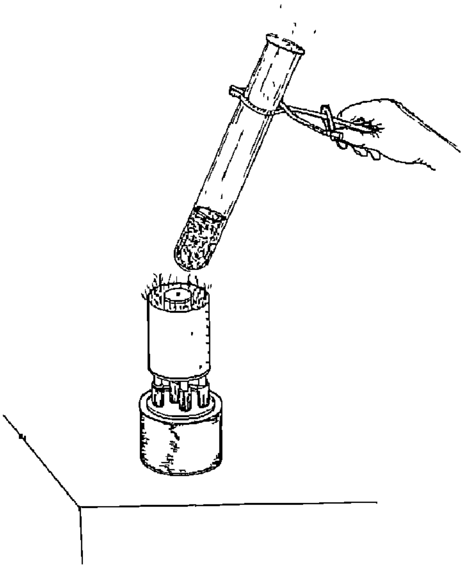
USES:-

1. To show magnetic force
2. To create interest in the students in various activities with a magnet e.g to identify thing, a magnet attracts, to observe poles, attraction and repulsion between them etc
   (V. 5.5 1)

Note: 1. Magnets should not be roughly used and heated
2. Like poles of magnets should not be put together.

ITEM A40 TEST TUBE HOLDER

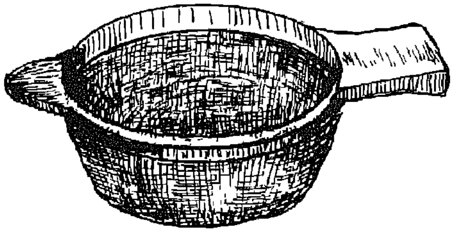


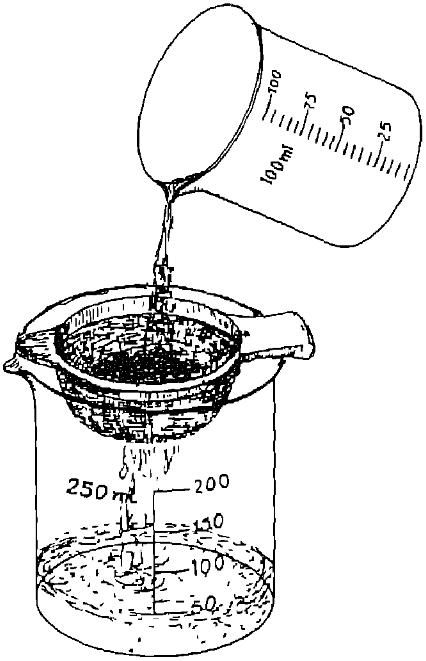


USES -

1. For holding test tubes while heating
2. To handle the hot chimney of the kerosene burner. (III. 3.4 1; IV. 6 5 4, 6 6.5)

ITEM A41 TEA STRAINER

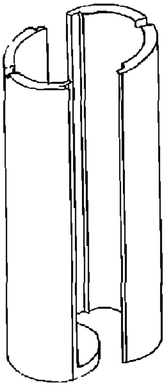


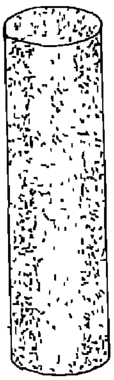


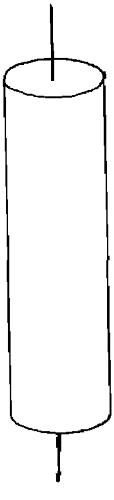
USES:-

1 To separate insoluble substances from a liquid
2 To separate fine sand from coarse sand.
3 To show how a net prevents flies from sitting on food articles and contaminating it

ITEM A42 MOULD FOR CHALK STICKS/SMALL CANDLES



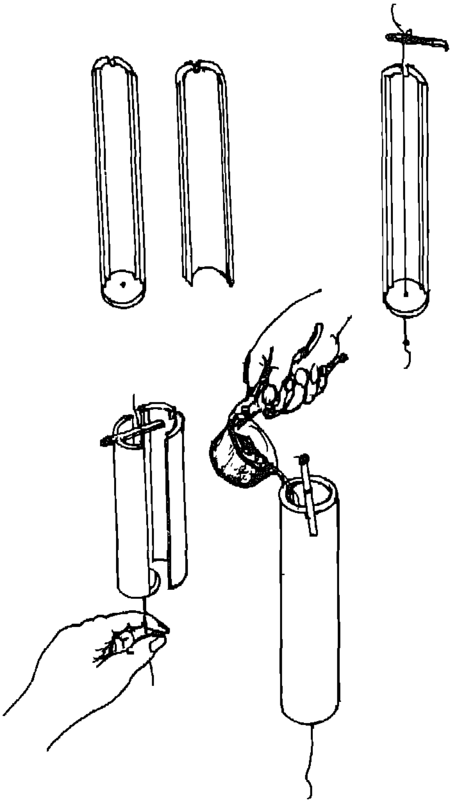




USES.-

1. To mould chalk sticks from paste of chalk powder
2 To mould small candles from molten wax

CHALK/CANDLE MOULD ASSEMBLY



Parts of assembly with Catalogue No

1 Chalk Powder/molten wax in aluminium Katori A 35

2. Candle/Chalk Mould A-42

3. Thread D2

4 Vaseline C8

Suggested Steps

1 Open the mould into two halves by pulling them apart.

2 For making a candle take a thread and pass it through the hole and tie at other end

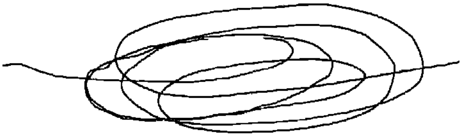
3 A coating of the vaseline should be made in inner side of each half of mould in case of candles

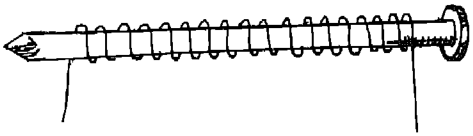
4. Combine both halves by fixing the edge of Part A to the groove of half B and close the assembly

5. Pour melted wax/kneaded chalk powder into mould and leave for sometime.

6 Separate two halves of mould and take out ready chalk/candle.

ITEM A43 SUPER ENAMELLED COPPER WIRE

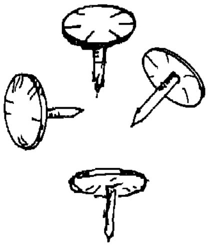




USES:-

1 To magnetise iron nail/rod by winding over it with enamelled copper wire and passing current through it
2 As a conducting wire in all experiments related to electricity
3 To demonstrate deflection in the needle of magnetic compass by winding it over the compass and passing current through it with the help of a cell

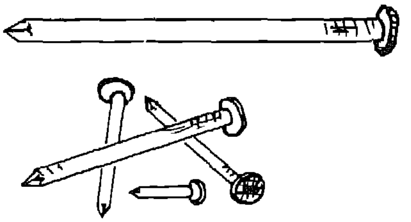
ITEM A45 DRAWING PINS

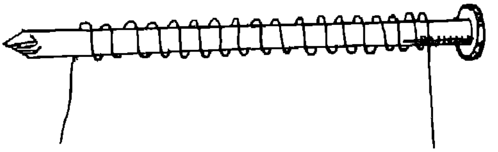


USES -

1. To fix small charts on the wall
2 As iron nails in some activities to show magnetic force. (IV 6 5 5)

ITEM A46 IRON NAILS (A) 1 4mm dia x 25 mm long (B) 2 mm dia x 25 mm long, (C) 5 mm dia x 125 mm long)



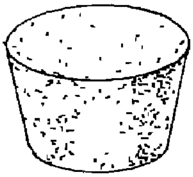


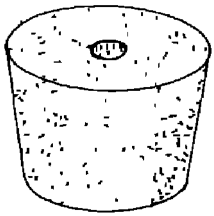
USES -

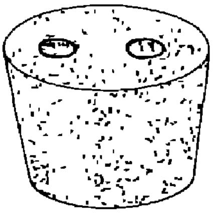
1 As an object of solid material
2. In hanging charts and any other object.
3 To show magnetic effect of current by converting iron nail into electro magnet
(III 3.9 2, IV 3 1 1, 3.2 1, 3 2 2, 3.3 1, 3 3 2, 3 1.2;
V· 4 2E.1, 5 5 1)

ITEM A47. RUBBER STOPPER

(a) for 15 mm diameter test tube
(b) with two holes 6 mm diameters and 8 mm diameter
(c) with the hole 6 mm diameter for 15 mm diameter test tube





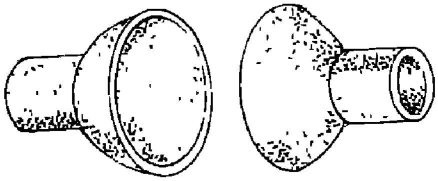


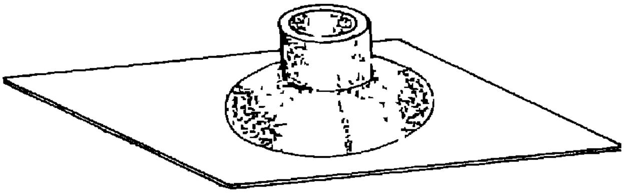
USES -

1 As an object of soft material
2 As a stopper for closing the mouth of the test tubes. (III 3.2.E1, IV. 2 1 4, 6 6.5, 6 5 4, V· 1 2.3)

ITEM A48 RUBBER SUCKER

25 mm cup diameter without handle



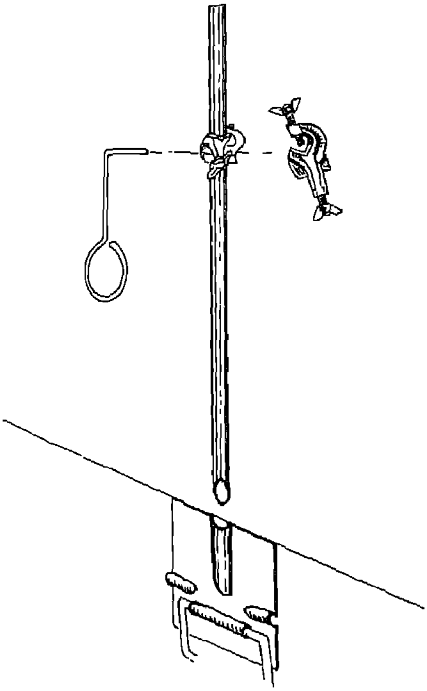


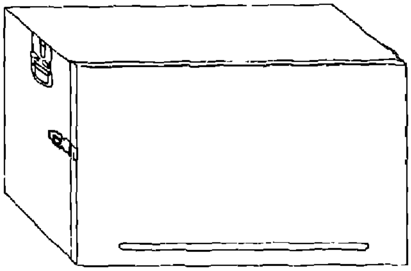
USES:-

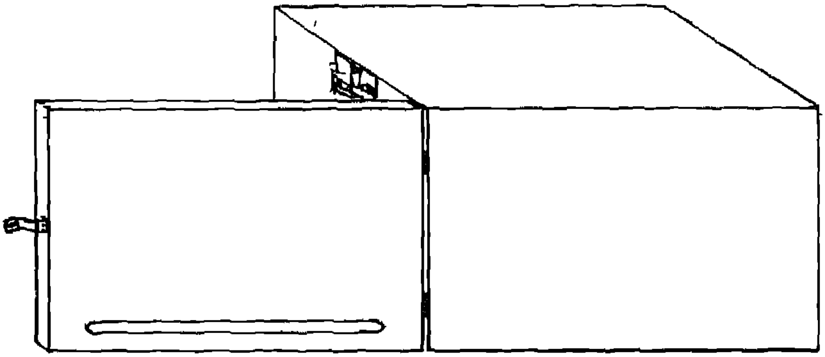
1 To show that air exerts pressure
(V 4.1.1)

ITEM A49: KIT BOX

(a) Kit box
(b) Trays
(c) Right angle clamp (boss head)
(d) Multi-purpose ring extension
(e) Laboratory rod



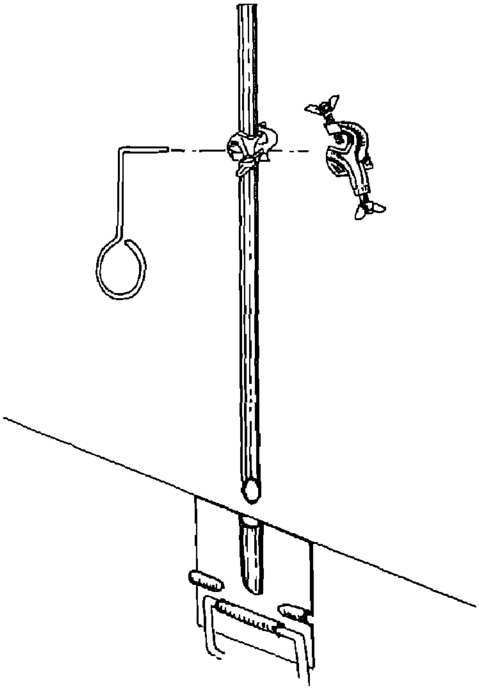




USES:-

1. To keep different items of kits safely
2 To be used as a blackboard (To make blackboard front door A of kit box is to be detached and fixed on the backside B of the kit box with the help of sockets)
3. To provide a base for stand with clamp and ring extension
4 To be used as a small table for experimental demonstration (III 4.3.3; IV, 3.2.1, 3.2.2, 3.5 2, 3.10,2, 3 11.1, 3.4,2, 4 2 1, 7 4.2, 7.5.2, 6 5.3, V. 3.1 1, 3 1.2, 3.1.3, 3.2 3)

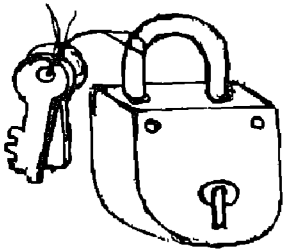
STAND



Parts of Assembly with catalogue No.
(1) Socket in kit box (A49 a)
(2) Laboratory rod A49(e)
(3) Boss head A49(c)
(4) Ring Extension A49(d)

Suggested Assembly Steps
(1) Fix the laboratory rod into the inbuilt socket of the kit box
(2) Fix the boss had on the rod.
(3) Fix the ring extension into clamp attached to Laboratory rod

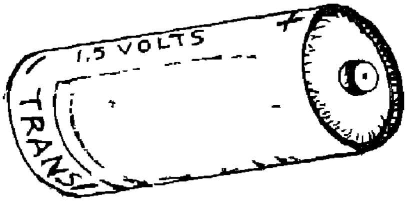
ITEM A50 LOCK AND KEY
PADLOCK WITH TWO KEYS



USES·-

To lock the kit box for safety

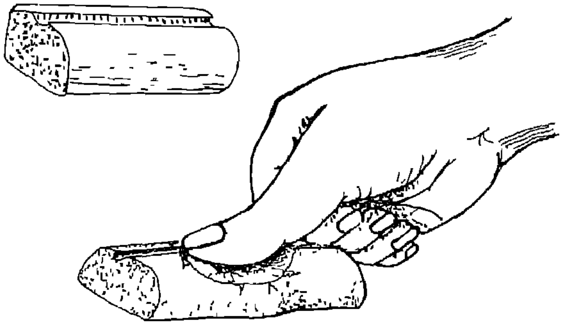
ITEM A51 CELL
NO R20, dry cell, 1.5 volts, leak proof.



USES.-

1 As a source of electrical energy in electric circuit board (IV 6.6.2)

ITEM D1 PLASTICINE

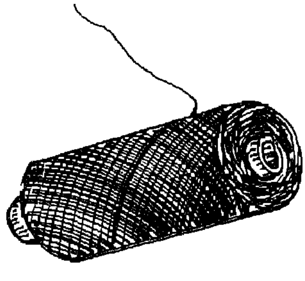


USES:-

As an object

1 To show that matter occupies space and has weight
2. To show the effect of force on plasticine substances.
(III 3.2.E1, 2 3.3, 2 1 E2, V.5 2 1, 6 3 1, 6.3.E1)

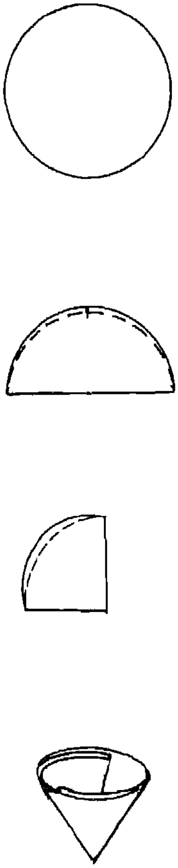
ITEM D2· COTTON THREAD

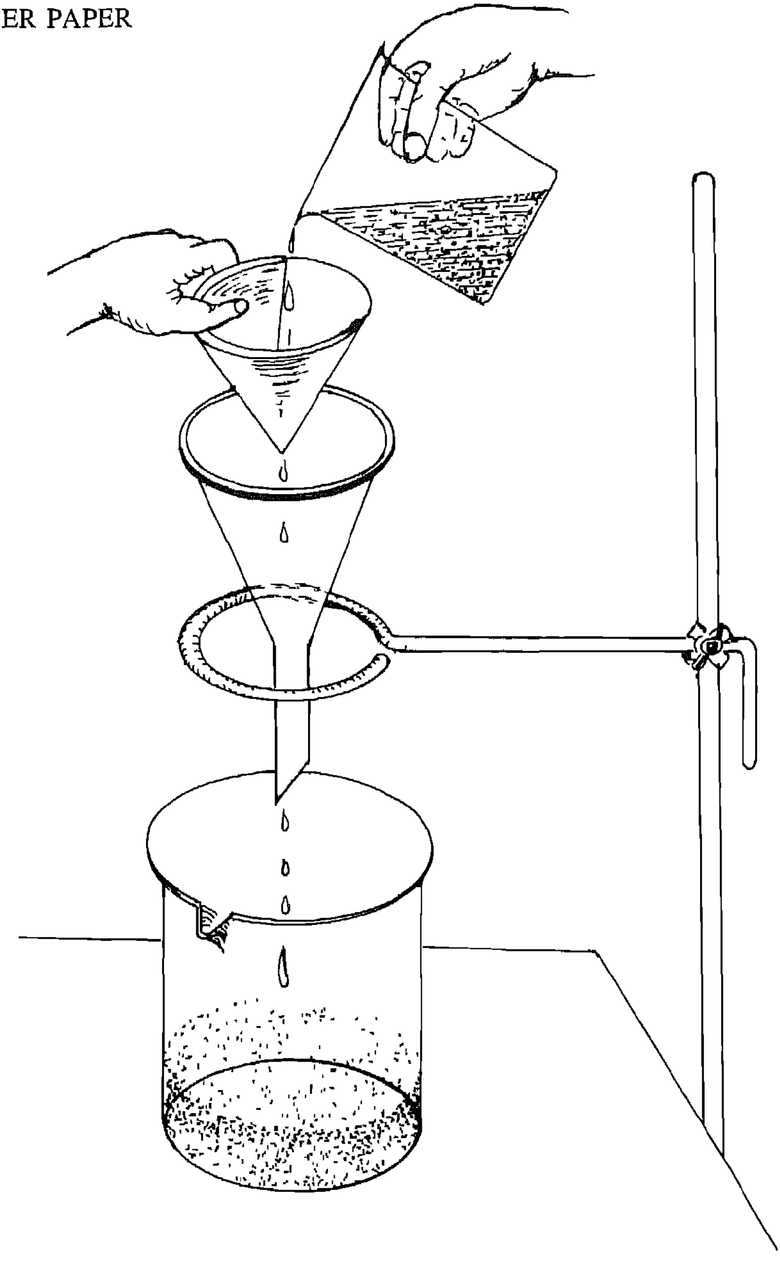


USES -

1 For comparing the lengths of arm, hand etc. of different students
2 To tie plastic bags and balloons
3 For suspending an object from stand to demonstrate force of gravity
(III, 2.3 3, 4 3.2, IV 2 1 8, 6 5.5, V· 1.5 1, 5 1 1, 5.8.1, 5.9.1)

ITEM D3 FILTER PAPER

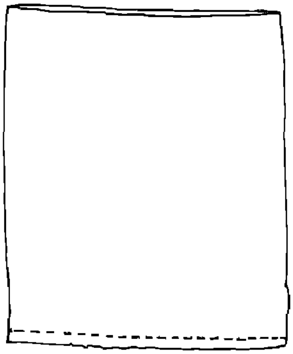


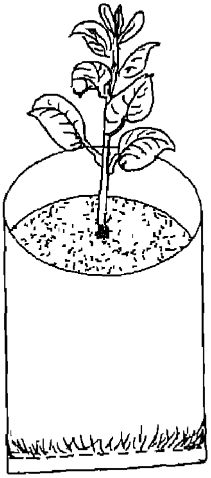


USES -

1 For separating insoluble substances from liquid by filtration (IV. 2 6 3, 3.10.2)

ITEM D4 POLYTHYLENE BAGS



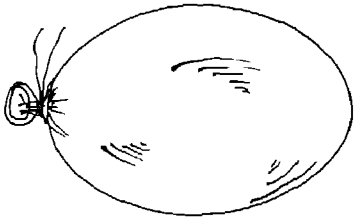


USES:-

1 As a container
2 As flower pots for germination of seeds by filling it with soil
(III: 1.2 1, 2.3 1, 2 8 E1, 4 3 2, IV 1.6.1, 5 3 1, 1.8.1)

ITEM NO D5 RUBBER, BALLOONS

(a) approx dia. 200mm when inflated
(a) approx dia 100 mm when inflated.

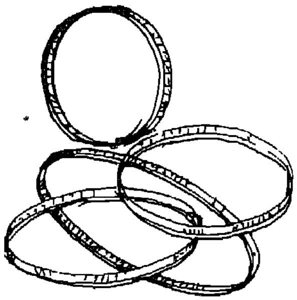


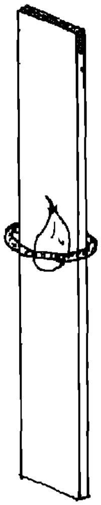
USES -

1 To show that air has weight
2 To demonstrate the process of breathing
3 To prepare diaphragm for stethoscope etc
4. To show that air can inflate things.
(III: 3.2.5; IV. 2.1 4, 2 1.8, 2 1 9; V 4 2 1, 5 2 1, 5 2.2)

ITEM D6 RUBBER BANDS

(a) 24 mm diameter (b) 50 mm diameter





USES -

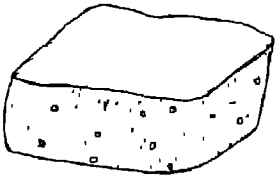
1 Used as an object
2. To fix seed on wooden plate to demonstrate conditions necessary for germination of seeds
3. To demonstrate effect of force
(III: 3.1.2, V· 1.5.1, 5.3.2)

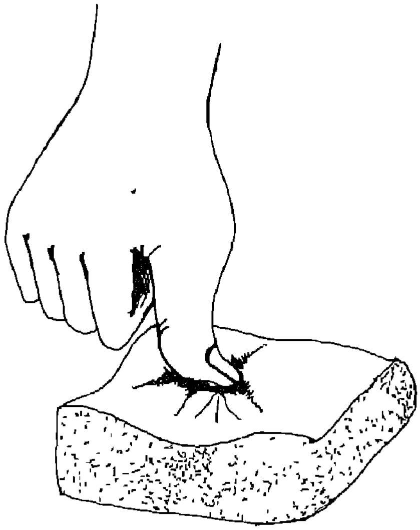
ITEM D7: SAND PAPER

USES :-

1. To clean the surfaces before using adhesive
2. To show rough surface
3. To make wooden surface smooth

ITEM D8. SPONGE

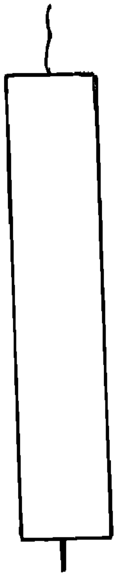




USES :-

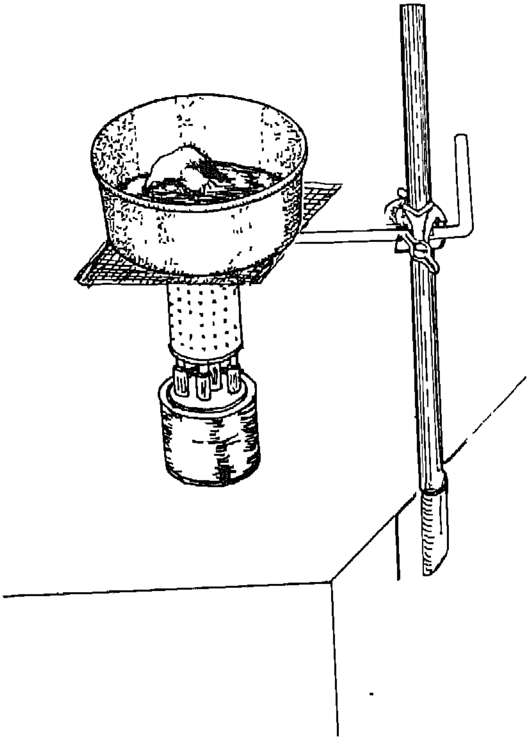
1. As an example of soft material, to feel softness
2. To show effect of force on soft substances
3. Can be used as duster
   (III: 2.2.1; V 5.2 2.)

ITEM D9 CANDLE



a source of light
n object
ow that air contains oxygen which is used in burning of a
ice
.3.1, 5.3 3, 5.4.E1; IV· 3 1.1 , 3 2 1, 3.2.2, 3 3 1,
3.4.2, 3 4.3, 7.3.1, 7.4 2, V 4.3 1, 6 1 2, 6.1 3, 6 1 4, 6 2.1, 6 2.2,
6.2 3, 6 4 1, 6.4 2)

ITEM D10· WAX



USES -

1 As an object
2. To prepare small candles
3. To show that solid changes into liquid on heating and liquid into solid on cooling
(III 3 9.2, IV: 3.7.3)

ITEM D11. CHALK POWDER

USES.-

1 To prepare chalk stick for writing on chalk board

ITEM D12. STRAW PIPES

USES.-

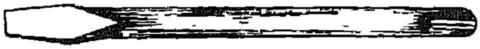
1. For blowing air into lime water
2. To show that air pressure can move liquids (III· 1 6 E1, IV 2.1.5; V 4 2 2)

ITEM E1 COMMON HANDLE

USES·-

1. As a common handle for poker and screw driver (V: 5 7 1, 5.7 4)

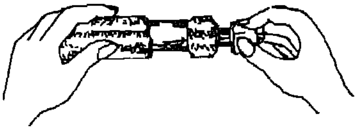
ITEM E2. SCREW DRIVER TIP

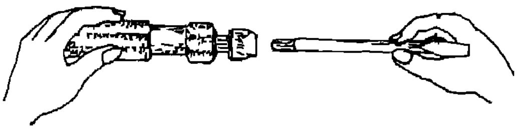


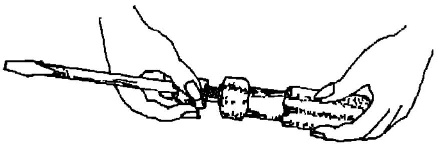
USES -

1 Used as a screw driver when fitted with the common handle
2 As lever
(V 5.7 4, 5 7.1)

COMMON HANDLE AND POKER/SCREW DRIVER TIP ASSEMBLY



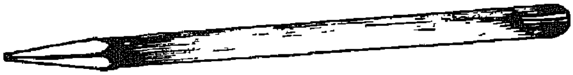




Parts of Assembly with Catalogue No
1 Common Handle E-1
2 Poker E3/Screw Driver Tip E-2

Suggested Assembly steps
1. Take common handle in hand and open it by screwing
2 Insert the poker/screw driver tip in open end of common handle upto base
3 After inserting tighten the common handle open end

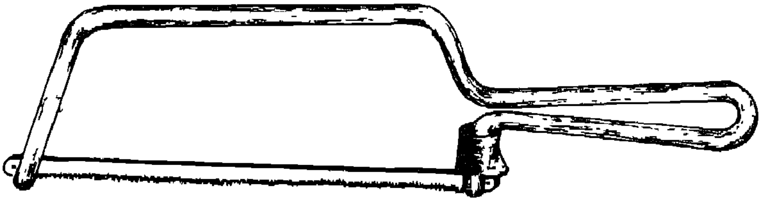
ITEM E3 POKER/DRILL TIPS



USES:-

As poker when fitted with common handle for making holes.

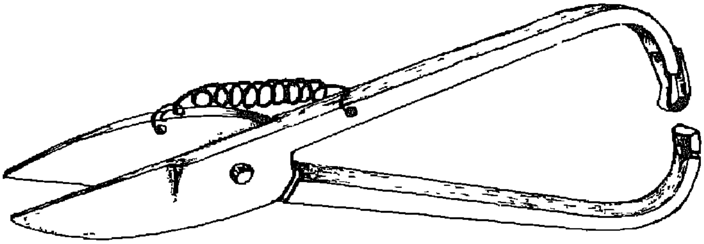
ITEM E4 JUNIOR HACKSAW WITH 5 SPARE BLADES (STEEL HARDENED)



USES.-

1. For cutting materials like wood, plastic, soft metals etc
   Note: It should not be used for cutting iron and steel

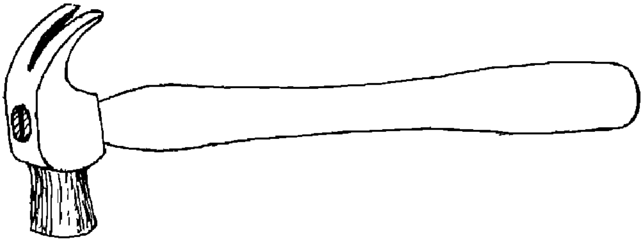
ITEM E5 TIN CUTTER



USES -

1 For cutting Tin
2 For pruning plants etc

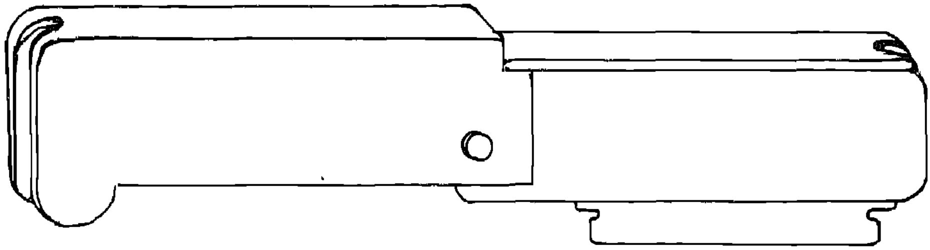
ITEM E6 CLAW HAMMER WITH WOODEN HANDLE



USES:-

1 To feel hardness
2. For breaking solid substances
3. For inserting iron nails in the walls
4 To remove inserted iron nails
5 As lever
(III 2.2.1, 3 1.2, IV. 3 5 1, 3 6.2, 3.8 1, 3 8 2, V: 4.2 E1)

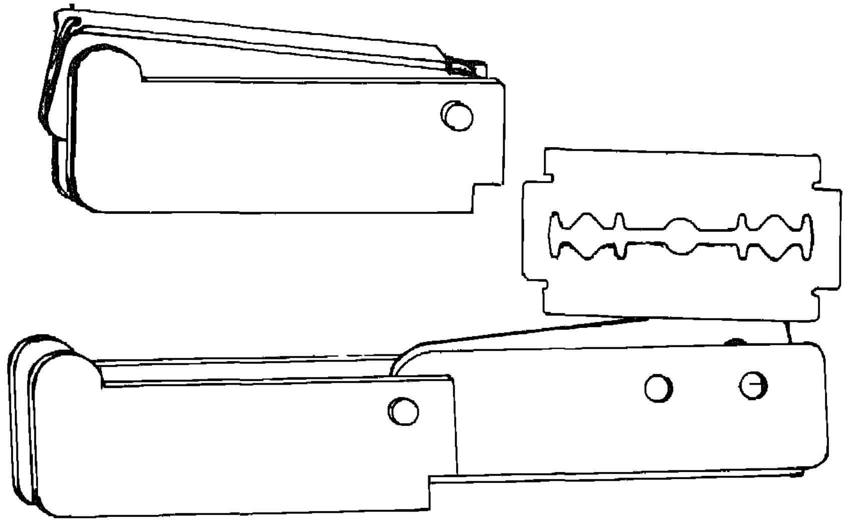
ITEM E7 BLADE WITH HOLDER

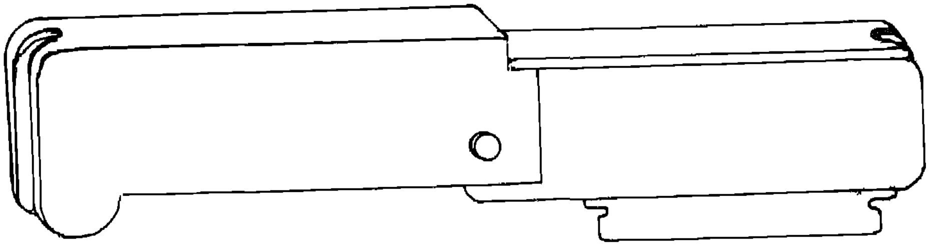


USES:-

1. For cutting soft objects e.g. for cutting parts of plant and paper etc
   (III 5 4 E1, IV 1 3 E1, 1.3.E2)

BLADE AND HOLDER ASSEMBLY





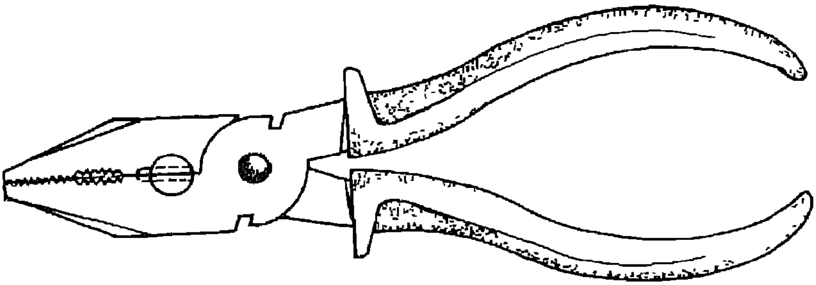
Parts of Assembly with kit item number

1 Blade and holder E-7

Steps suggested to assemble.

1 Open the blade holder and part A with the help of the small screw driver
2. Part A has two halves and have points for holding the blade Fix blade between two halves of part A and press to close it

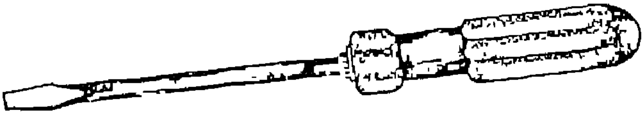
ITEM E8 COMBINATION PLIER



USES.-

1 For cutting metallic wire
2 For removing inserted iron nails
3 For holding etc

ITEM E9. SCREW DRIVER WITH 3mm BLADE, STANDARD



USES -

1 For screwing

Repair of kit items by Teacher

SAFETY PRECAUTIONS AND FIRST AID

A. Safety Precautions and Correct use of Tools

1. A Screw driver should be used to turn screws and not to lever off the lid of a packing case.
2. A saw should not be forced. It should be sharpened it it cuts slowly.
3. One should not try to saw plane iron nails
4. The tools should be sharpened even if rough work is to be done.
5. The sharpened tools should be properly stored
6. Rusting should be prevented by using grease
7. Iron or plastic dust should never be blown
8. One should never stand very close to a lighted kerosene burner if dressed in synthetic clothes
9. One should never play with match sticks.
10. One should be very careful while lighting a burner or candle.
11. One should never taste unknown chemicals

B First Aid

1. Even minor cuts and injuries should be given due care and in no case they should be neglected
2. In case of minor cuts dettol should be used.
3. Bleeding should be stopped as soon as possible by placing a clean cloth or cotton pad firmly over the wound and they by pressing it.
4. In case of bleeding a doctor should be consulted
5. In the case of injury to the eyes or presence of any foreign panticle in the eyes should be examined by a doctor
6. In case of burns, Burnol should be applied.

KIT MAINTENANCE SCHEME

1 CHECKING OF KIT ITEMS

Loose Page (Form for users record)

1 Name of teacher Incharge of Primary Science Kit

2 Name of School with address

Date	Name of teacher	Activity No	Item with NO	Signature for issue	Sig for return	Remark consumed/ broken/lost	Signature of teacher Incharge

Repair, replacement and purchase order * for items, Consumed/Broken/Lost/

Name of School with Address

* Item of Primary Science Kit may be purchased, replaced or repaired from Science Kit Berosia Road Bhopal or Vigyan kit Virmanshala, Workshop, State Institute of Science Education, Allahabad or from the nearest D I E.T

Name of Items with number	Date of order for repair/replacement/ purchase	Signature of the Teacher Incharge	Signature of Headmaster	Remarks

Annexure

Participant teachers of the orientation and Tryout Programms held in M P, U P and Delhi during April/May, 1988, of Teacher's Handbooks on Environmental Studies-Science for classes III, IV and V and Primary Science Kit

1. Shri Mahesh Bagwaia
Govt Primary School
Mullani
Sehore (M P)

2 Shri Ashok Chauhan
Govt. Subhash Middle
School Sehore (M P)

3 Shri Manohar Gupta
Govt Primary School
Imatia Narend
C.No 2, Berasia
Bhopal (M.P)

4 Shri R G. Nema
Chandrashekar Azad
Middle School
Bhopal (M.P.)

5 Shri O.P Sharma
Govt Primary School
Security Lines
Bhopal (M P)

6 Shri J.N. Shrivastava
Govt Middle School
Arera Colony
Bhopal (M P)

7 Shri Basant Singh
Kasturba High School
Bhopal (M P)

8. Shri S V Singh
Govt Vivekanand High
School, Sehore (M.P)

9. Shri C.P Singh
Govt. Primary School
Bijora
Sehore (M P)

10 Shri Shailendra Srivastava
Govt. Girls Primary
School C No.1, Berasia
Bhopal (M.P)

11 Smt Suman Thakur
Govt. Sanjay Gandhi Middle
School, Bhopal (M P)

12 Shri Raj Bahadur
Junior Basic Vidyalaya
Tulsipur
Allahabad (U.P)

13. Smt Asha Isuviyus
Rajkiya Basic Demonstration
School
(C P I)
Allahabad (U.P)

14. Shri Lal Bahadur Jaiswal
Junior Basic Vidyalaya
Nainibazar
Allahabad (U.P)

15 Shri Suresh Narian Mishra
Primary Pathshala
Phaphamau
Allahabad (U P)

16. Shri Kamalesh Narian Misra
Primary Pathshala
Kareilabagh Gaon
Allahabad (U P)

17 Shri Kripashankar Misra
Adarsh Vidya Mandir
Reserve Police Line
Lucknow (U.P)

18 Shri Ram Vilas Misra
Junior Basic Primary School
Sadatganj
Lucknow (U.P)

19 Shri Sheo Darshan Misra
Rajkiya Sodh Vidyalaya
(attached to SIE
Allahabad (U P)

20 Shri Sarda Prasad Tripathi
Primary Pathshala
Ismail Ganj
Allahabad (U P)

21 Smt. Sharda Sharma
Junior Basic Vidyalaya
Chinhat
Lucknow (U.P.)

22 Shri Radhey Shyam
Primary Pathshala
Kaurihar
Allahabad (U.P.)

23 Shri Prabha Shankar Shukla
Junior Basic Primary
Pathshala
Nishat Ganj
Lucknow (U.P)

24 Shri Ram Kamal Shukla
Adarsh Vidyalaya
(Attached to G I.C),
Nishat Ganj
Lucknow (U P)

25 Shri Prabhakarvardhan Singh
Primary Pathshala
Tharwai
Allahabad (U P)

26. Shri Raghuvandan Singh
P.A.C Vidya Mandir
35, P.A C
Lucknow (U P.)

27. Smt Amarlata Srivastava
Primary Pathshala
Rehikala
Allahabad (U P)

28. Smt Kamini Srivastava
Junior Basic Vidyalaya
Chinhat
Lucknow (U P)

29 Shri Marchhu Yadav
Rajkiya Adarsh Vidyalaya
(Attached to Normal School)
Shivkuti
Allahabad (U P.)

30 Shri Uma Shankar Yadav
Junior Basic Vidyalaya
Musalib Ganj
Lucknow (U P)

31. Smt Snigdha Chandra
Air Force Bal Bharti School
Lodi Road
New Delhi

32 Smt Priti Chawla
Air Force Ball Bharti School
Lodhi Road
New Delhi

33. Smt Deepika Gurnani
NDMC Junior Navyug School
Laxmi Bai Nagar
New Delhi

34. Smt. Promila Madan
Bhartiya Vidya Bhawan
Kasturba Gandhi Road
New Delhi

35 Smt Radhika Mathur
Delhi Public School
Vasant Vihar
New Delhi

36 Smt Jaya Mehta
Mother's International School
Sri Aurobindo Marg
New Delhi

37 Smt Uma Puri
Mother's International School
Sri Aurobindo Marg
New Delhi

38 Smt Saroja Ramchandran
Delhi Public School
Vasant Vihar
New Delhi

39 Km Padmini Shankar
Bharatiya Vidya Bhawan
Kasturba Gandhi Road
New Delhi

40 Smt Bela Sharma
Air Force Bal Bharti School
Lodi Road
New Delhi

41 Smt Indu Bala Sharma
NDMC Junior Navyug School
Laxmi Bai Nagar
New Delhi

42 Smt Veena Yadav
Mother's International School
Sri Aurobindo Marg
New Delhi

"PACKING LIST"
"PRIMARY SCIENCE KIT"
NEW MODEL

KIT BOX NO

UPPER TRAY

Quantity	Name of item	Sl No.
1.	Multipurpose pump	A-19
2	Pulley	A-21
2	Mounting Needles	A-22
6.	Glass Slide	A-25
2	Ferrite Magnets	A-39
1	Test tube holder	A-40
1	Laboratory Rod	A-49-C
1.	Common handle	E-1
1	Screw Driver tip	E-2
1	Pocker Drill tip	E-3
1.	Jr hack saw with 5 Nos Extra blades	E-4
1	Tin cutter	E-5
1	Claw hammer	E-6
1	Combination plier	E-8
1	Screw Driver	E-9
1	Right angle clamp	A-49-C

MIDDLE TRAY

Quantity	Name of item	S.No
1	Tailors Measuring tape	A-1
6	Plastic spoon	A-3
2.	Disposable plastic syringe	A-4
5 each	Cubic cm blocks (white & black)	A-9
1.	Small plastic Ball	A-15
1.	Y shape plastic tube	A-17
1	Battery holder	A-18-b
1	Bulb holder	A18-c
1.	Switch	A-18-d
3 each	Multicore wire with Bannana plug 30 cm long & 17 cm long	A-18-c
2	Crocodile clip	A-18 F
1	Glass Nozzle	A-27
	Glass Balls	A-29
10 each	10 mm & 15 mm	
5 each	20 mm & 25 mm	
1	Tea stainer	A-41
1	Mould for chalk/Candle	A-42
1.	Plastic beaker	A-5
1	cell 1 5 V.	A-51

50g	Plasticine	D-1
	(All above mentioned items are lying in DM^3	
1	Dm^3 vessel	A-8
1 mt	Plastic tubing	A-23
1	Water Wheel	A-34
2	All Katories	A-35
100 g	Wax	D-10
12	Filter Paper	D-3
	(All above mentioned items are lying under the globe	
1	Water Wheel handle	A-34
1	Sponge	D-8
100 g	Chalk powder	D-11
	(All above items are lying under Test tube stand)	
1	Spring balance	A-10
1	Magnetic campass	A-11
1	Laboratory thermometer with holder	A-12
1.	Globe	A-14
1.	Funnel	A-16
6	Hand lens	A-28
1.	Test Tube stand	A-37
1	Multipurpose Ring Extension	A-49 d
1	Blade holder	E-7

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Lower Tray

Quantity	Name of the items	S No
1	Glass Beaker	A-6
1 Lying in glass beaker	Plastic Beaker	A-5
	Mirrored plastic fol	A-13
	Rubber stoper	A-47
3 a)	C For 15 mm & test tube	
1 b)	C With 2 holes 6mm O & 9mm O (for 25 mm O test tube	
2 c)	(With 1 hole 6mm & for 15mm & test tube.	
1	Measuring cylinder	A-7
1mt.	(Super enamelled copper wire	A-43
1	(Lock & Keys	A-50
1 roll	(Cotton thread	D-2
	(All the above items are under wedge)	

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10	...st	30
1	(Wire gauge UNIT	33
1	(Plane mirror	A-36
2	(Rubber Sucker	A-48
20	(Polythelene bags	D-4
18	(Rubber balloon (Big & asserted)	D-5
24	(Rubber bands (Big & small)	D-6
	(all the above items are under circuit board)	
1	Electric circuit board	A-18
1	Wedge	A-30
2	Boiling tube	A-31
1	Kerosene burner	A-32
11	Iron Nails (asserted)	A-46
1	Candle (lying in cylinder)	D-9
12	Straw pipe	D-12
30g	Hard coke	B-1
20g	Mica	B-2
30g	Slate stone	B-3
90g	White marble	B-4
90g	Granite	B-5
90g	Lime stone	B-6
90g	Fertilizer (ammonium sulphate or urea)	C-1
50g	Fertilizer (Calcium superphosphate)	C-2
30ml	Glycerine	C-3
50g	(Kasting soda	C-4
50g	Common salt (mined crystals)	C-5
50g	Potassium permanganate in crystal from	C-6
50g	Sugar	C-7
30g	Vaseline	C-8
50g	Alum	C-9
20g	Iron filings (drawing pin)	C-10

...Education
Library ...
Unit (...)
Acc. No. F17285
Date 7.4.87

Under lower tray (in the bottom of Box)

Quantity	Name of the items	S No
1	Ruler	A-2
2	Attachment for earth & moon model	A-14 & A-15
	Hangers for aluminium katories	A-35
	Kit manual	G-2
eets	sand paper	D-7
	Charts	F-1 & f-23
	Teacher's handbook	G-1
	Hanger for Charts	G-3
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